
GPS AutoSteer System

Installation Manual



Supported Vehicles

CNH

Case Puma	New Holland
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Large Frame

165	T7030
180	T7040
195	T7050
210	T7060

Small Frame

115	T6030
125	T6050
140	T6070
155	T6080

LEGAL DISCLAIMER

Note: Read and follow ALL instructions in this manual carefully before installing or operating the AutoSteer system.

Note: Take careful note of the safety information in the Safety Information section and throughout this manual.

The manufacturer disclaims any liability for damage or injury that results from failure to follow the instructions and warnings set forth herein.

Please take special note of the following warnings:

1. There is NO obstacle avoidance system included in the manufacturer's product. Therefore, users must always have an operator on the equipment when the AutoSteer system is in use to look for any obstacles including people, animals, trees, ditches, buildings, etc.
2. During installation of the AutoSteer system and during the Calibration and Tuning processes the vehicle's wheels turn from side to side and the vehicle moves. Be sure that all people and obstacles are clear of the vehicle before installation, calibration and tuning, or use of the AutoSteer system.
3. Use of the AutoSteer system is NOT permitted while the vehicle is on public roads or in public areas. Ensure that the system is OFF before driving on roads or in public areas.

Special Requirements

Tools

This list consists of the tools required to complete the installation. The installer is assumed to have a complete set of common installation tools.

#1 Phillips screwdriver	3/8" open wrench	10mm open wrench
#2 Phillips screwdriver	7/16" open wrench	15mm open wrench
#2 Phillips stubby screwdriver	1/2" open wrench	17mm open wrench
Pliers	9/16" open wrench (2)	21mm open wrench
1/2" socket and ratchet	11/16" open wrench	24mm open wrench
9/16" socket and ratchet	3/4" open wrench	27mm open wrench (large frame)
15/16" socket and ratchet	13/16" open wrench	1/8" Allen wrench
8mm socket and ratchet	7/8" open wrench	3/16" Allen wrench
10mm socket and ratchet	15/16" open wrench	5/32" Allen wrench
13mm socket and ratchet	1-1/8" open wrench	4mm Allen wrench
17mm socket and ratchet	Hack saw	5mm Allen Wrench
18mm socket and ratchet	10 ft (3 meter) ladder	10mm Allen Wrench
24mm socket and ratchet	Tape measure 12ft (3.6m) minimum	12mm Allen Wrench
5000 PSI pressure gauge	Electrical tape	



Safety Information



Warning Alerts



The AutoSteer system installer and manufacturer disclaim any responsibility for damage or physical harm caused by failure to adhere to the following safety requirements:



- As the operator of the vehicle, you are responsible for its safe operation.
- The AutoSteer system is *not* designed to replace the vehicle's operator.



Note: Verify all screws, bolts, nuts, and cable connections are tight after the final installation of the AutoSteer system on the vehicle.



	<div data-bbox="670 779 933 821"> WARNING</div> <p data-bbox="435 848 1091 936">To avoid electrical shock hazards, remove the Roof Module from the vehicle before driving under low structures or low electrical power lines.</p>
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	<div data-bbox="670 1083 933 1125"> WARNING</div> <p data-bbox="435 1152 1091 1297">To prevent injury from falling, ensure you are in a stable position on the vehicle when installing or removing the Roof Rail and Roof Module. If the vehicle does not provide a safe platform, use a ladder to safely access the vehicle roof while installing or removing the Roof Rail and Roof Module.</p>
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	<div data-bbox="670 1415 933 1457"> WARNING</div> <p data-bbox="435 1484 1091 1572">To prevent accidental death or injury from being run over by the vehicle, never leave the vehicle's operator chair with the AutoSteer system engaged.</p>
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	<div data-bbox="430 277 1089 346"> WARNING</div> <div data-bbox="430 346 1089 522"><p>High-Pressure Fluid Hazard</p><p>Read this manual before installation. Wear hand and eye protection while performing hydraulic system maintenance. Relieve hydraulic system pressure before servicing the hydraulic system.</p></div>
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	<div data-bbox="430 609 1089 678"> WARNING</div> <div data-bbox="430 678 1089 825"><p>To understand the potential hazards associated with the operation of AutoSteer system equipment read the provided documentation before installing the AutoSteer system on a vehicle.</p></div>
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	<div data-bbox="430 913 1089 982"> WARNING</div> <div data-bbox="430 982 1089 1127"><p>To prevent the accidental engagement of AutoSteer and loss of vehicle control while driving on roads, shut down the AutoSteer system (exit the program). Never drive on roads or in public areas with the AutoSteer system turned on.</p></div>
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	<div data-bbox="430 1215 1089 1285"> WARNING</div> <div data-bbox="430 1285 1089 1432"><p>Do not stand close to the wheels and do not move the machine while you are adjusting the Relief Valve. Turn off the engine and engage the parking brake before standing under or next to the machine.</p></div>
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Caution Alerts



The AutoSteer system installer and manufacturer disclaim any responsibility for damage or physical harm caused by failure to adhere to the following safety requirements:



	 CAUTION
	The Roof Module must be removed when transporting or driving the vehicle at speeds above 30 mph (50 km/h). The Roof Module can possibly detach due to wind loads at higher speeds.

	 CAUTION
	The AutoSteer system does not detect obstacles in the vehicle's path. The operator must observe the path being driven in order to avoid obstacles.

	 CAUTION
	When engaged, the AutoSteer system controls only the steering of the vehicle. The operator must control the speed of the vehicle.

	 CAUTION
	The AutoSteer system must be powered OFF when installing or removing the Roof Module.

	 CAUTION
	The AutoSteer system must be powered OFF when starting or cranking the vehicle's engine.

	 CAUTION
	The Roof Module must always be firmly secured to the Roof Rail using the hardware whenever the vehicle is in operation to prevent the Roof Module from releasing from its bracket and falling.

Vehicle Requirements

The vehicle must be equipped with a fully functional Power Beyond System. The Power Beyond system provides the following ports on the rear of the vehicle:

- Pressure
- Return Line
- Load Sense

The vehicle steering and hydraulic systems must be in good working order before installing the AutoSteer system. Check for loose or worn parts. Before installing the AutoSteer system drive the vehicle and confirm that it steers straight and the wheels can be turned from lock to lock. Check the steering system hydraulic hoses and connections to ensure there are no oil leaks.

The vehicle electrical system and battery must be in good working order.

The vehicle should be fully cleaned before installing the AutoSteer system. A clean vehicle will improve the overall installation and cable routing and will also reduce the chance for oil contamination when the hydraulic connections are opened. It is important to clean the area around the steering unit (Orbitrol), under the cab and behind the rear cab cover.

Important Information

Note: Verify all screws, bolts, nuts, hose, and cable connections are tight after the final installation of the AutoSteer system on the vehicle.

Technical Support

Refer to your Display user manual for technical support information.

Contact Information

Refer to your Display user manual for contact information.

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Installation Overview

The **Installation Overview** chapter information is provided in the following sections:

- *Vehicle Inspection*
- *Installation Kit Overview*
 - *Sub-Assemblies*
 - *Steering Valve Kit Components*
 - *Hose Kit Components*
 - *Bracket Kit Components*
- *Installation Procedure Outline*
- *Cable Diagram*

This installation guide describes the installation of the AutoSteer system on several models of Case and New Holland MFWD vehicles. The AutoSteer installation kit PN: 188-0044-01 is used on the following models:

- Case Puma Large Frame 165, 180, 195, 210
- Case Puma Small Frame 115,125,140,155
- New Holland T7030, T7040, T7050, T7060
- New Holland T6030, T6050, T6070, T6080

The vehicle specific sub-assemblies for the vehicle series are listed in *Table 1-1*.

Vehicle Inspection

The vehicle's steering system must be in good working condition prior to the installation of the AutoSteer system. Verify the existing steering system is operating correctly by performing the tests listed below in a wide open area.

Note: The steering system test requires a relatively large area. Ensure you have enough room to perform the test before beginning.

1. Drive the vehicle in a low gear and slowly turn the steering wheel all the way to the left. The vehicle should steer to the left at a steadily increasing rate until it is making a sharp left turn.
2. Drive the vehicle in a low gear and slowly turn the steering wheel all the way to the right. The vehicle should steer to the right at a steadily increasing rate until it is making a sharp right turn.

Note: The change in steering speed should mirror the speed and angle when turning left or right.

3. On flat terrain, drive the vehicle in a straight line in a low gear and release the steering wheel. The vehicle should continue to drive fairly straight without pulling hard left or right.

Note: This vehicle has reactive steering so large bumps on the ground may cause the front wheels and steering wheel to move. Also, if the wheels are turned to full lock left or right and the steering wheel is let go, the steering wheel will move back towards center and the front wheels will gradually straighten themselves out.

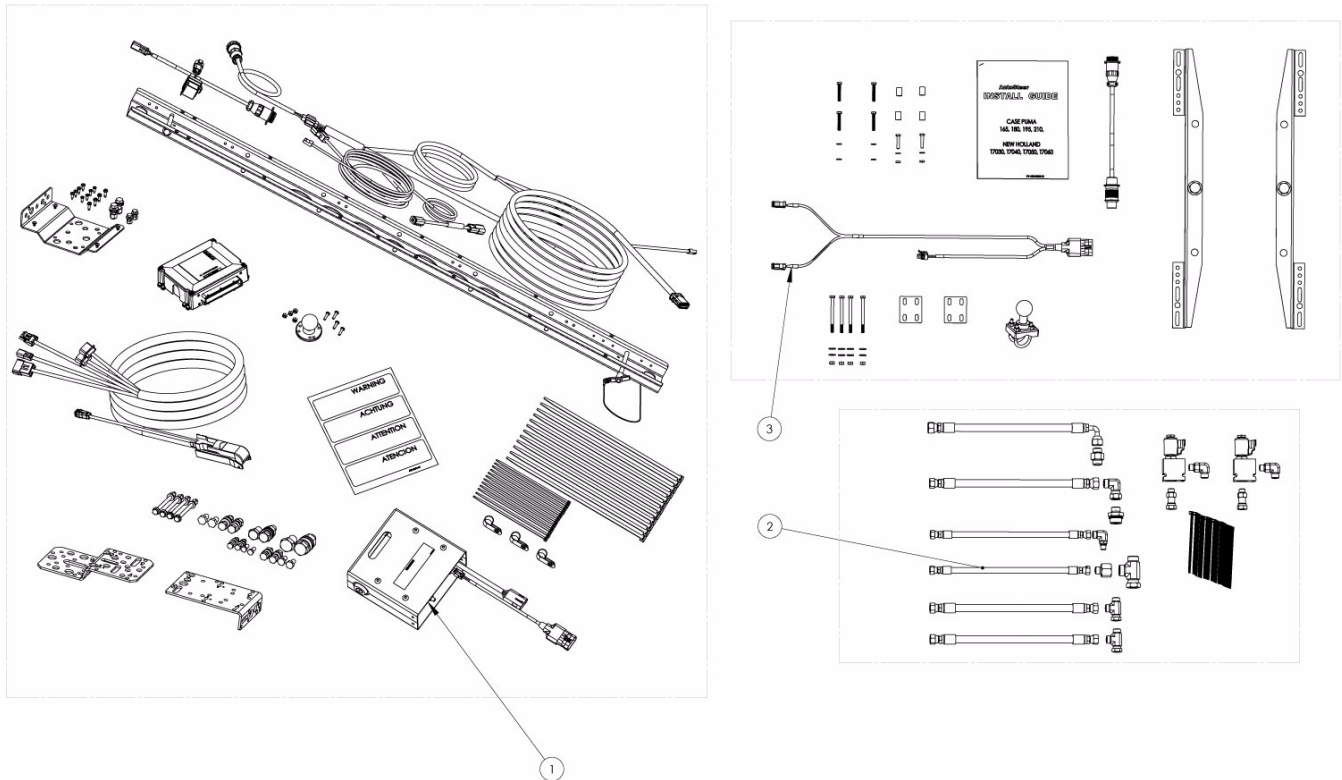
4. Ask the vehicle driver or owner if they have experienced any vehicle steering problems. The operator should report no steering problems.

If the vehicle passes the four tests, proceed with the AutoSteer system installation. If the vehicle fails one or more of the tests, the steering system must be evaluated by a dealer and repaired if necessary.

Possible causes of steering problems:

- Worn joints in steering cylinders and tie rods
- Hydraulic problem

Figure 1-1 Installation Kit Components (PN: 188-0044-01)



Item	Component	Part Number
1.	Steering Valve Kit	153-0001-01
2.	Hose Kit	500-0366-01
3.	Bracket Kit	152-0054-01

Sub-Assemblies

- *Steering Valve Kit Components*
- *Hose Kit Components*
- *Bracket Kit Components*

Steering Valve Kit Components

Figure 1-2 Installation Kit Components (PN: 153-0001-01)

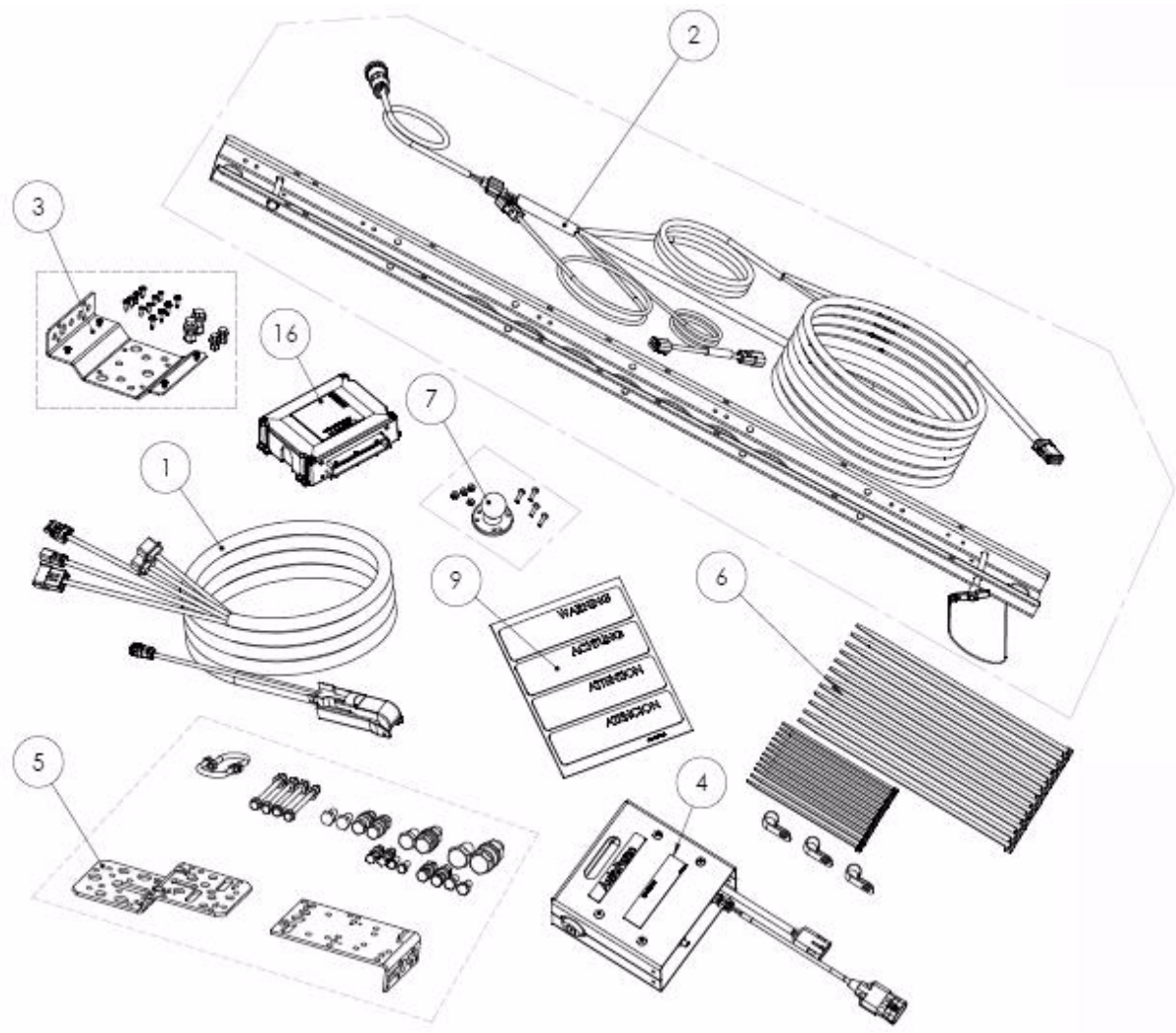


Table 1-2 Installation Kit Components (PN: 153-0001-01)

Item	Component	Part Number
1.	SA Module Harness	201-0371-02
2.	Common Installation Kit	200-0497-02
3.	SA Module Bracket	200-0190-01
4.	Valve Assembly	200-0457-01
5.	Valve Bracket Kit	200-0434-01
6.	Mounting Hardware	200-0076-01

Item	Component	Part Number
7.	Display Mounting Base Assembly	200-0508-01
9.	Warning Labels	603-0074-01
16.	SA Module Assembly	200-0206-01

Hose Kit Components

Figure 1-3 Hose Kit Components (PN: 500-0336-01)

THESE ENDS CONNECT TO COMPACT VALVE

THESE ENDS CONNECT TO MACHINE

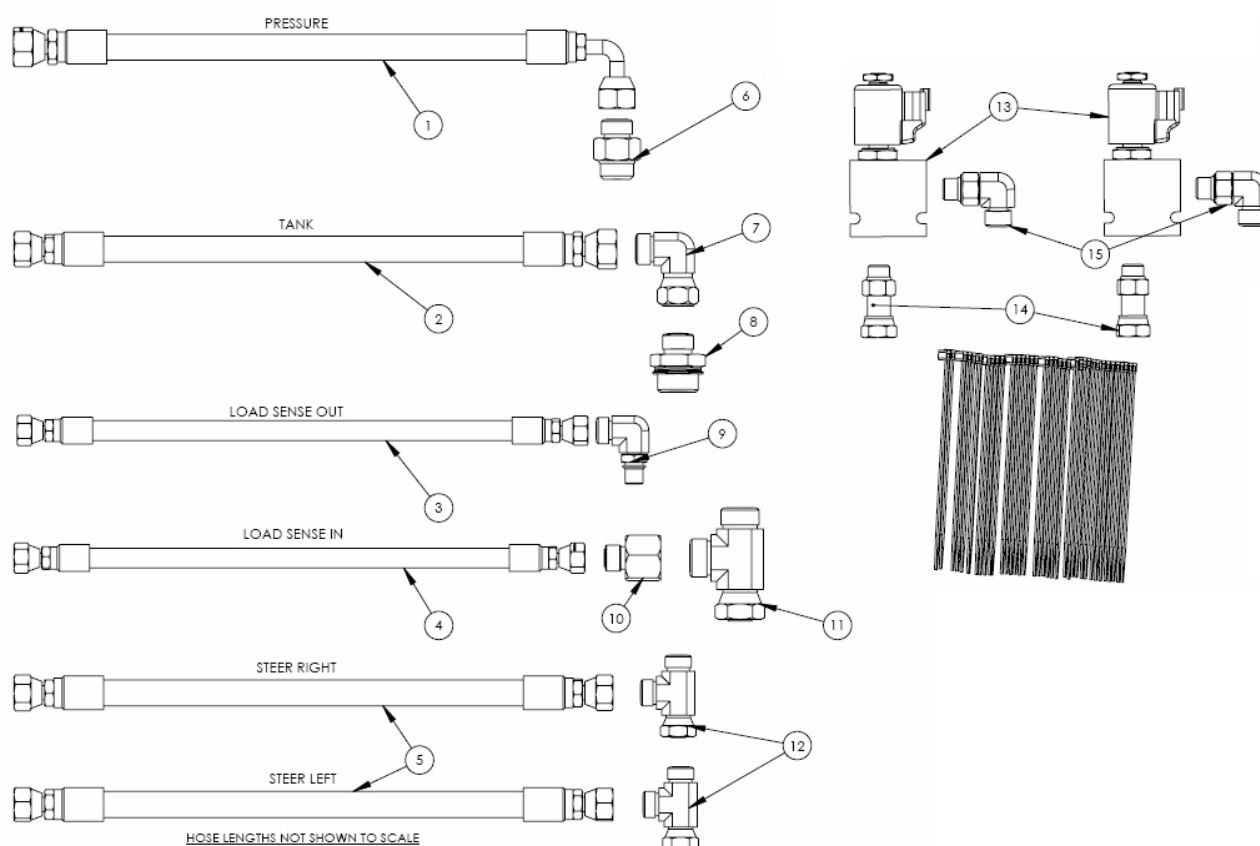


Table 1-3 Hose Kit Components (PN: 500-0336-01)

Item	Component	Part Number
1.	Hose Assembly 3/8" x 141"	F451TC-JCJ9080806-141
2.	Hose Assembly 3/8" x 137"	F451TC-JCJC060806-137
3.	Hose Assembly 1/4" x 122"	F471TC-JCJC040404-122
4.	Hose Assembly 1/4" x 122"	471TC-JCJC040404-67

Sub-Assemblies

Item	Component	Part Number
5.	Hose Assembly 3/8" x 60"	F451TC-JCJC060606-60
6.	Adapter, M22 ORB - ORFS #8M	506-0036-01
7.	Elbow Adapter, #8 ORFS	8_C6LO-S
8.	Shallow Port Adapter, M27 ORB - ORFS #8M	506-0161-01
9.	Elbow Adapter, M12 ORB - ORFS #4M	4M12C87OMLOS
10.	Adapter Expander, ORFS #10F - ORFS #4M	10-4 TRLON-S
11.	Run Tee Adapter, #10 ORFS	10_R6LO-S
12.	Run Tee Adapter, #6 ORFS	6_R6LO-S
13.	Solenoid Assembly	500-0361-01
14.	Adapter, SAE 6M, ORFS #6F	6_F65OL-S
15.	Elbow, SAE 6M, -ORFS #6M	6_C5LO-S
16.	Cable Ties	200-0467-01

Bracket Kit Components

Figure 1-4 Bracket Kit Components (PN: 152-0054-01)

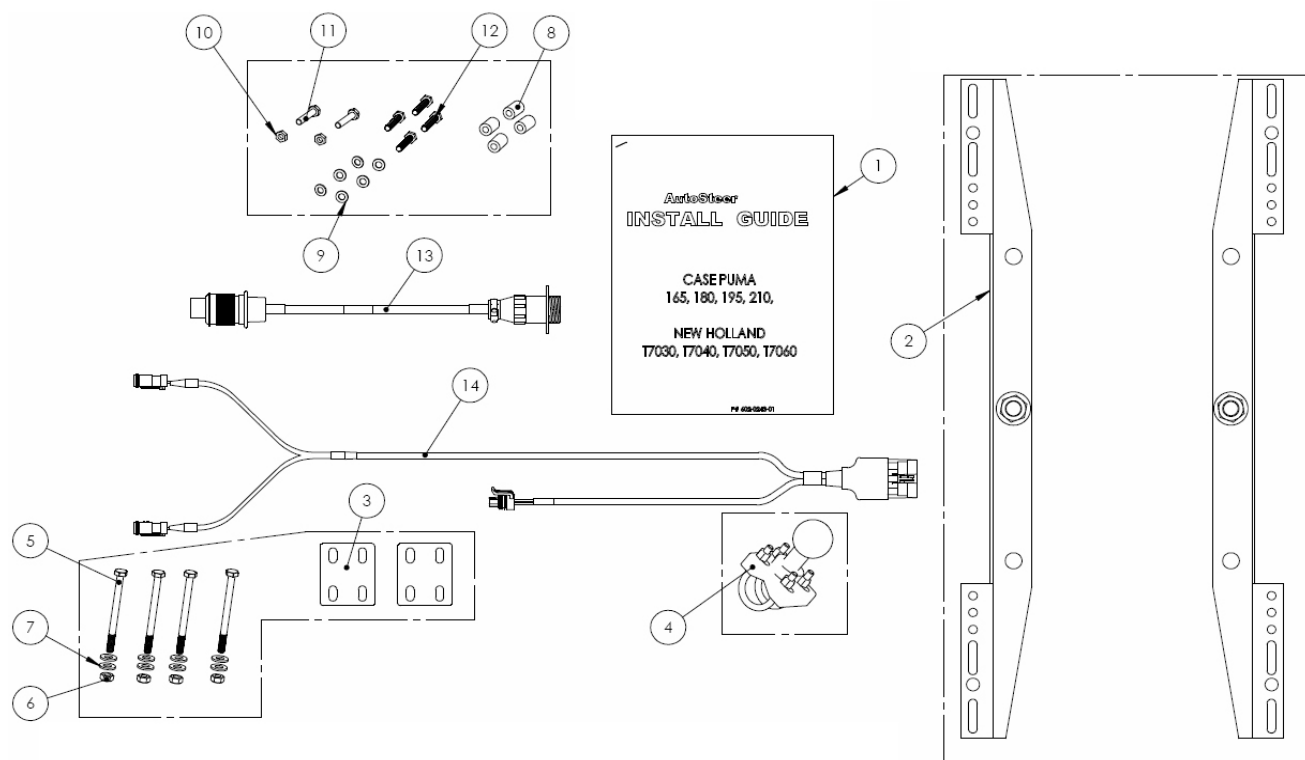


Table 1-4 Bracket Kit Components (PN: 152-0054-01)

Item	Component	Part Number
1.	Installation Guide	602-0243-01
2.	Roof Rail Bracket Assembly	200-0387-02
3.	RAM Mount Base	202-0419-01
4.	RAM Mount Double U-Bolt	207-0010-01
5.	Hex Bolt	512-0033-01
6.	Hex Nut	518-0013-01
7.	1/4" Flat Washer	516-0002-01
8.	1/4" Spacer	521-0035-01
9.	M6 Flat Washer	517-0014-01
10.	M6 Hex Nut	519-0009-01
11.	M6X1X30 Bolt	513-0040-01

Sub-Assemblies

Item	Component	Part Number
12.	M6X1X40 Bolt	513-0045-01
13.	Cable Power Adapter	201-0234-01
14.	Harness, Reactive Steering	201-0480-01

Installation Procedure Outline

Note: The system interconnect cable diagram in the *Cable Diagram* on page 10 section of this chapter shows the AutoSteer electrical connections.

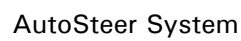
1. Verify that all components have been received.

Note: Step 2, Step 3, Step 7, Step 8, and Step 9 are skipped if installing an electric steering actuator.

2. Install the Wheel Angle Sensor. (Optional).
3. Install the SA Module.
4. Install the Roof Rail on the cab roof.
5. Install the Roof Module on the Roof Rail.
6. Install the Display using a RAM Mount Ball.
7. Install the SA Module Harness.
8. Install the Steering Valve.
9. Install the Hydraulics.
10. Install the Main Cable Harness.
11. Connect the Main Cable Harness to the Display Harness.

Note: Instructions for connecting the vehicle kit cables to the Display can be found in the Display user manual.

12. Verify that all connectors are properly coupled and secured.
13. Power ON the AutoSteer system.
14. Calibrate the vehicle.
15. Tune the vehicle.
16. Verify the system has been installed properly and operates satisfactorily.



Steering Valve Installation

This **Steering Valve Installation** chapter contains the following sections:

- *Setup Steering Valve*
- *Mount Steering Valve*
- *Install the Hydraulic Hoses and Fittings*
 - *Large Frame*
 - *Small Frame*
- *Adjust the Relief Valve*

Setup Steering Valve

1. Use a 3/16" Allen key to remove the four cover screws. See *Figure 2-1*.

Figure 2-1 Remove Cover Screws



2. Remove the six back cover bolts using a 1/2" socket and ratchet. See *Figure 2-2*.

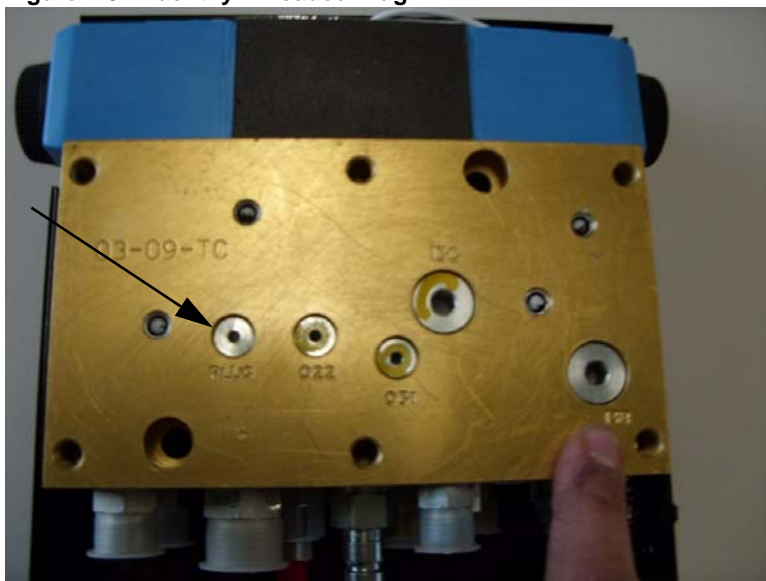
Figure 2-2 Remove Back Cover Bolts



3. Identify the threaded plug shipped with the Steering Valve in a parking position identified as “PLUG” on the front face. See *Figure 2-3*.

Note: The plug does not have a hole and must not be mistaken with the two orifices that are also shipped next to the plug on the Steering Valve.

Figure 2-3 Identify Threaded Plug



4. Locate the large external access plug identified in position **13B**. Remove the external plug in position **13B** using a 1/4" hex key. See *Figure 2-4*.

Figure 2-4 Remove Plug in 13B



5. Remove the small plug from the "PLUG" position using a 1/8" hex key. See *Figure 2-5*.

Figure 2-5 Remove Small Plug in 13A



6. Install the small plug inside the hole in position **13B**. It will engage an existing thread about 1" below the surface. Tighten using a 1/8" hex key.
7. Re-install the large external plug in position **13B**. See *Figure 2-6*.

Figure 2-6 Reinstall Plug in 13B



8. Locate the large external access plug identified in position **13A**. Remove the external plug in position **13A** using a 1/4" hex key. See *Figure 2-7*.

Figure 2-7 Remove Plug in 13A



9. Remove the small plug from position **13A** using a 1/8" hex key. See *Figure 2-8*.

Note: This plug is the internal plug which lies about an inch from the surface (on the left in *Figure 2-8*).

Figure 2-8 Remove Small Plug in 13A



10. Remove the orifice labelled .022 using a 1/8" hex key. See *Figure 2-9*.

Figure 2-9 Remove .022 Orifice



- 11. Insert the orifice into the **13A** hole and tighten with a 1/8” hex key.
- 12. Insert the large plug back into the **13A** hole and tighten with a 1/4” hex key. See *Figure 2-10*.

Figure 2-10 Reinstall Both Plugs in 13A



Table 2-1 shows the summary of all plug and orifice configurations for this procedure.

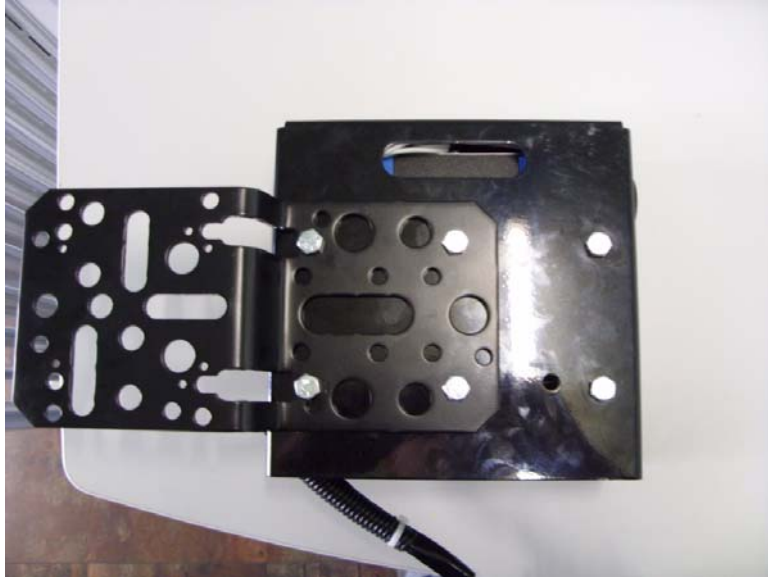
Table 2-1 Plug and Orifice Configuration Summary

Configuration	13A	13B	13C
Power Beyond with LS Bleed Down	0.022”	Plug	Plug

Mount Steering Valve

1. Mount the Steering Valve on the bracket by placing the block backing plate between the valve and the bracket and using the four existing screws which are located on the back of the block. See *Figure 2-11*.

Figure 2-11 Mount Steering Valve on Bracket



2. Identify the area on the left side of and below the rear of the hood (next to fuel tank) to mount the Steering Valve.
3. Remove the plastic covers to reveal the threaded holes. See *Figure 2-12*.

Figure 2-12 Remove Plastic Covers



4. Mount the bracket as shown in *Figure 2-13* using two bolts and washers.

Figure 2-13 Mount Bracket



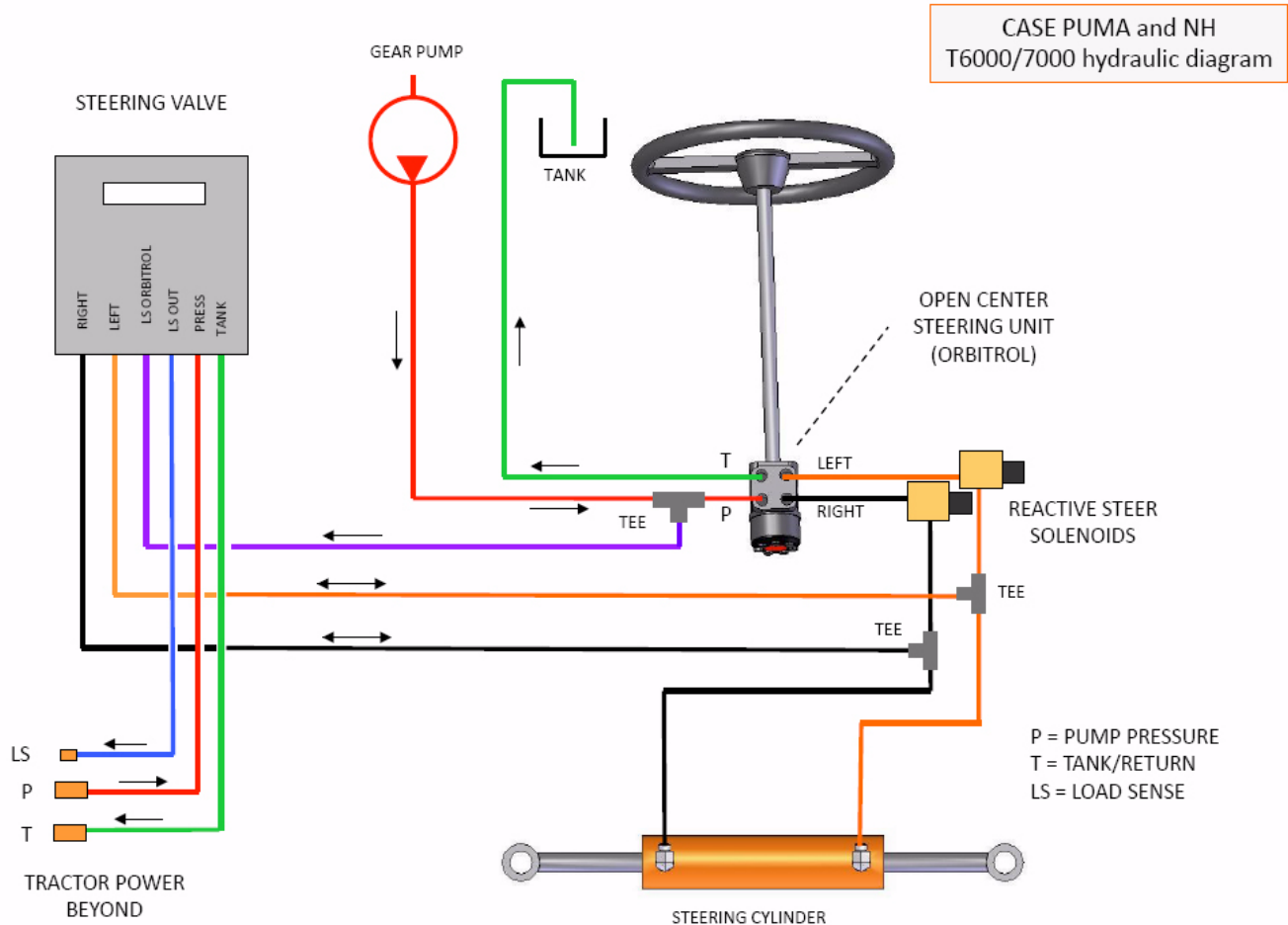
Install the Hydraulic Hoses and Fittings

This **Install the Hydraulic Hoses and Fittings** section contains the following sub-sections:

- *Large Frame*
- *Small Frame*

Figure 2-14 shows an overview of the hydraulic installation.

Figure 2-14 T6000/7000 Hydraulic Diagram



Large Frame

1. Find the following ports and lines on top of the Power Beyond. See *Figure 2-15*.

- Pressure port, which is the M22 with a 27mm head.
- Load Sense port, which is the small M12 with a 5mm hex socket.
- Tank/Return line, which is behind the valve stack (highlighted with a circle).

Figure 2-15 Locate Pressure, Load Sense, and Return Line



2. Find the Tank/Return port on back the Power Beyond. See *Figure 2-16*.

Note: To see this you must look between the cab and the Power Beyond block. This is a large M27 fitting with a 12mm hex socket (shown in *Figure 2-15* with a circle).

Figure 2-16 Location of Tank/Return Port



3. Open the hood by pressing on the black rubber grommet and lifting up the front handle. See *Figure 2-17*.

Figure 2-17 Open Hood



4. Remove side guards by loosening the two bolts using a large flat-head screw driver; then slide the panel forward. See *Figure 2-18*.

Figure 2-18 Remove Side Guards



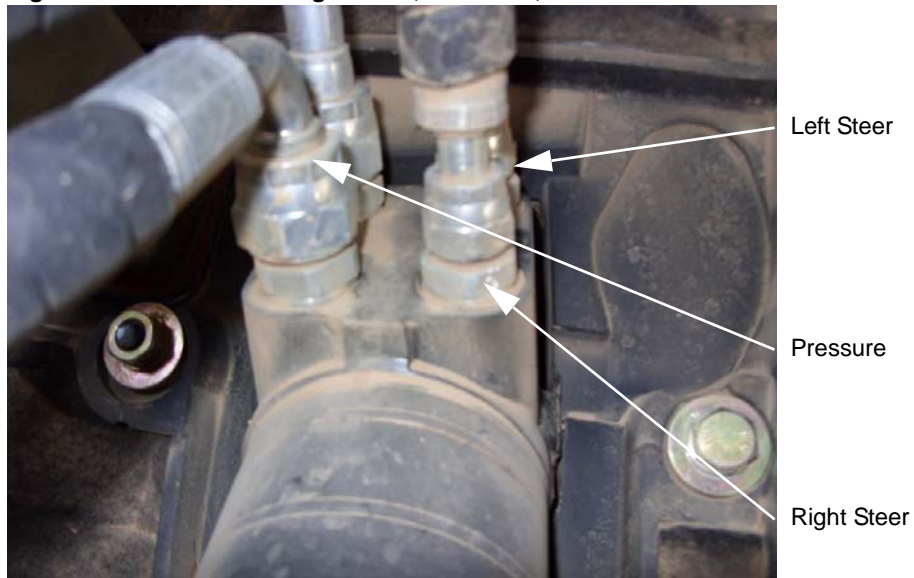
5. Find the Left Steer and Right Steer lines, which are behind the panel removed in the *Step 4*. See *Figure 2-19*.

Figure 2-19 Left and Right Steer Lines



6. Find the Pressure line and Left Steer and Right Steer lines on the Orbitrol. See *Figure 2-20*.

Figure 2-20 Location of Right Steer, Left Steer, and Pressure Lines



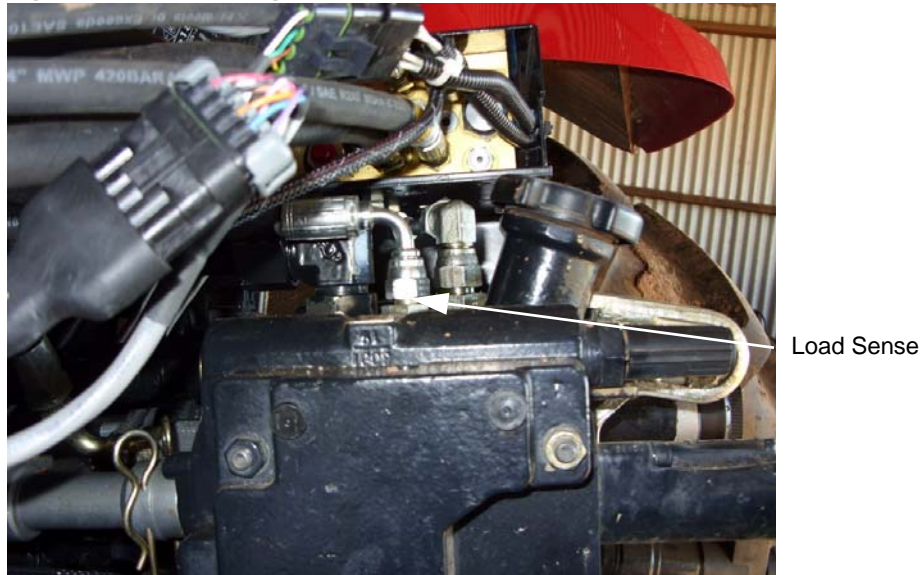
7. Connect a long 3/8" hose (the PRESSURE hose) to the **P port** on the Power Beyond. You must use a M22 metric to -8 ORFS male adapter to connect this hose to the Power Beyond. Then route the hose under the cab to the Steering Valve. See *Figure 2-21*.

Figure 2-21 Connecting to Pressure



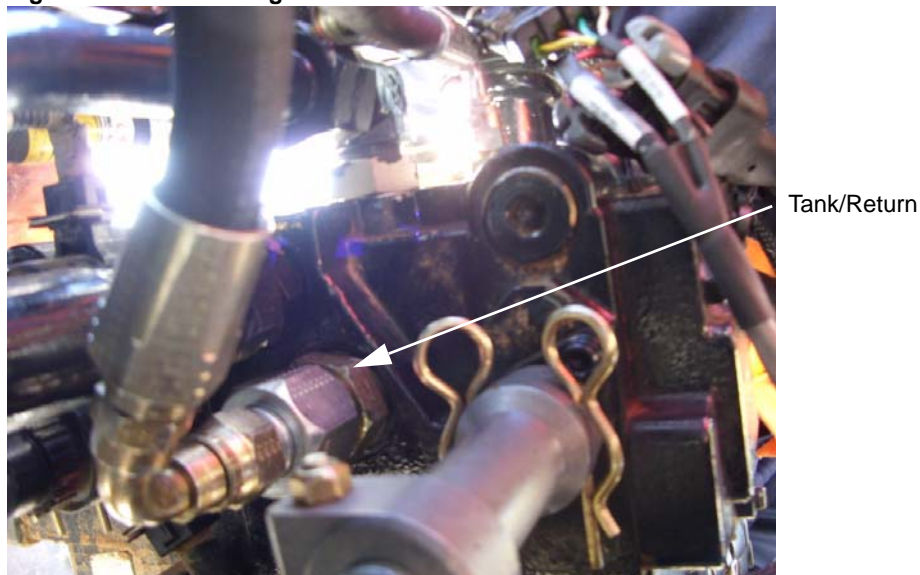
8. Connect a long 1/4" hose (the LS OUT hose) to the **LS port** on the Power Beyond. You must use a M12metric to -6 ORFS male elbow adapter to connect the end of the hose to the Power Beyond. Then route the hose under the cab to the Steering Valve. See *Figure 2-22*.

Figure 2-22 Connecting to Load Sense



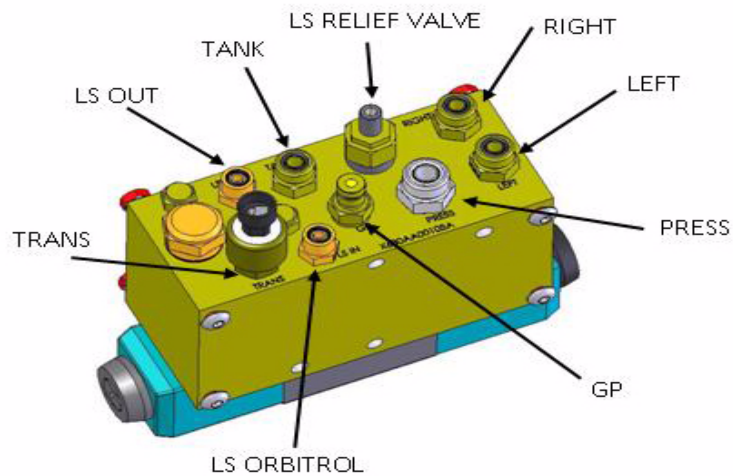
9. Connect a short 3/8" hose (the TANK hose) from the **TANK port** on the AutoSteer valve to the **T port** on the Power Beyond. You must use a M27 metric to -8 ORFS male adapter to connect the end of the hose to the Power Beyond. Then route the hose under the cab to the Steering Valve. See *Figure 2-23*.

Figure 2-23 Connecting to Tank/Return



10. Connect the LS OUT hose from *Step 9* to the **LS OUT port** on the Steering Valve. See *Figure 2-24*.
11. Connect the TANK hose from *Step 8* to the **LS OUT port** on the Steering Valve. See *Figure 2-24*.
12. Connect the PRESSURE hose from *Step 7* to the **PRESS port** on the Steering Valve. See *Figure 2-24*.

Figure 2-24 Steering Valve Ports



13. Remove the Pressure, Steer Left, and Steer Right hoses from the Orbitrol. See *Figure 2-25*.
14. Connect a long 1/4" hose (the LS ORBITROL hose) from the **LS ORBITROL port** on the Steering Valve and the **PRESSURE port** on the side of the tractor's steering unit (Orbitrol). You must install a run tee and a reducer before connecting the hose to the Orbitrol. See *Figure 2-25*.

Note: If you can't screw the original pressure hose back on because it is on the wrong angle, follow the next four steps; if not proceed to *Step 19*.

Figure 2-25 Connecting Orbitrol Hoses



15. Remove the right-hand front guard by removing the three screws with a #2 Phillips screw driver. See *Figure 2-26*.

Note: Only complete this step if you could not complete *Step 14*.

Figure 2-26 Remove Right Front Guard



16. Loosen the fitting as shown in *Figure 2-27*.
17. Retry to screw in the hose from *Step 14*.
18. Re-tighten the fittings from *Step 16* and replace the right hand side front guard. See *Figure 2-27*.

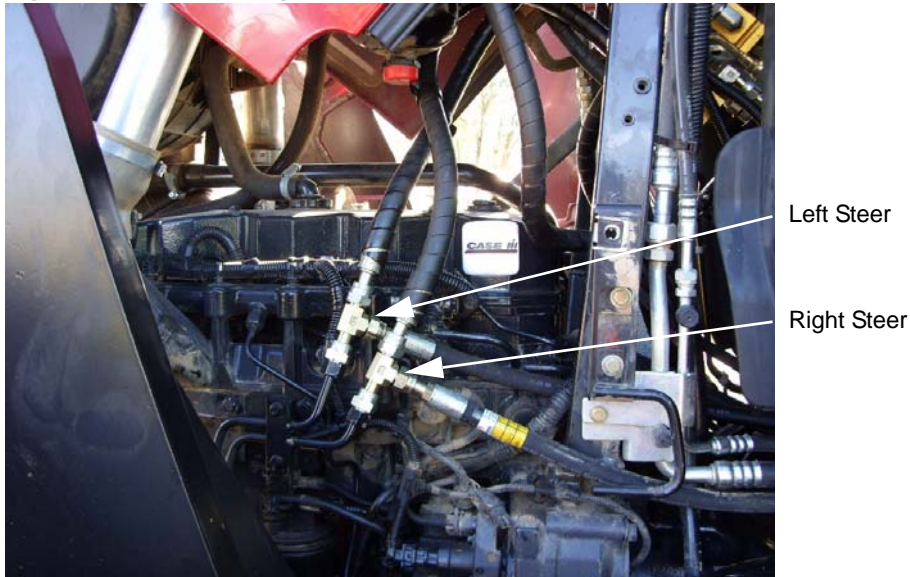
Note: Only complete the above steps if you could not complete *Step 14*.

Figure 2-27 Adjust Pressure Fitting



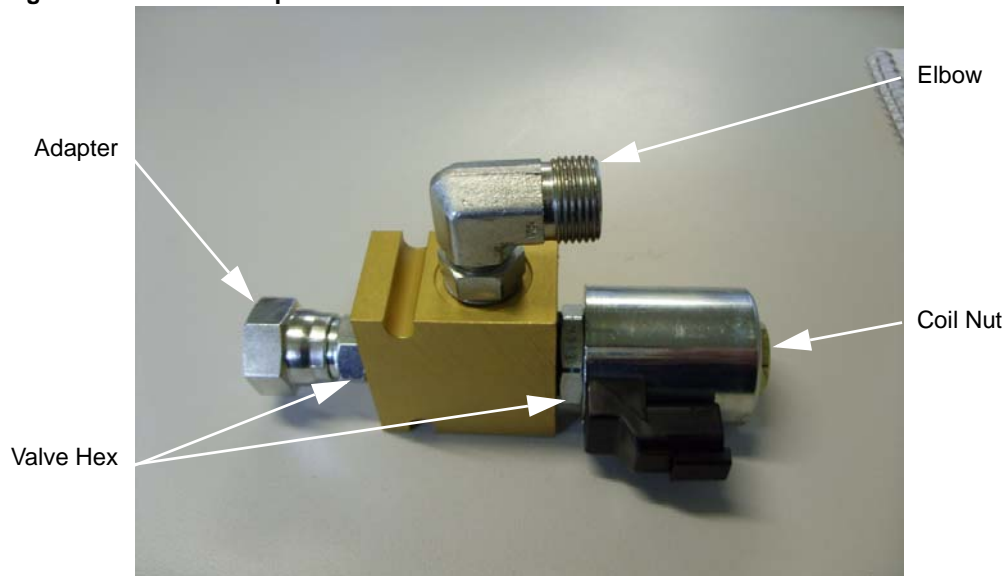
19. Connect a 3/8" hose (the **RIGHT** hose) from the **RIGHT port** on the Steering Valve to the **Right Steer Hose** on the tractor. You must install a run tee on the **Right Steer Hose** to allow the hose connection. See *Figure 2-28*.
20. Connect a 3/8" hose (the **LEFT** hose) from the **LEFT port** on the Steering Valve to the **Left Steer Hose** on the tractor. You must install a run tee on the **Left Steer hose** to enable the hose connection. See *Figure 2-28*.

Figure 2-28 Connect Right and Left Steer Hoses



21. Prepare the two solenoid valves by attaching the adapters and elbows as shown in *Figure 2-29*. Confirm the valve hex is tight and the coil nut is firm.

Figure 2-29 Attach Adapters and Elbows



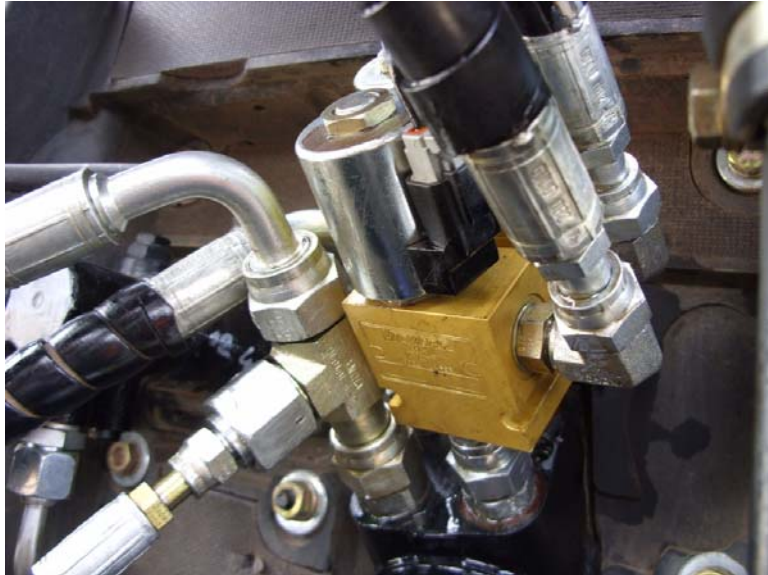
22. Place one solenoid assembly directly on to the **L port** on top of the steering unit (Orbitrol) and connect the Left Steer line into the other side of the solenoid assembly. See *Figure 2-30*.

Figure 2-30 Attach One Solenoid onto L Port



23. Place the second solenoid assembly directly on to the **R port** on top of the steering unit (Orbitrol) and connect the Right Steer line into the other side of the solenoid assembly. See *Figure 2-31*.

Figure 2-31 Attach Second Solenoid onto R Port

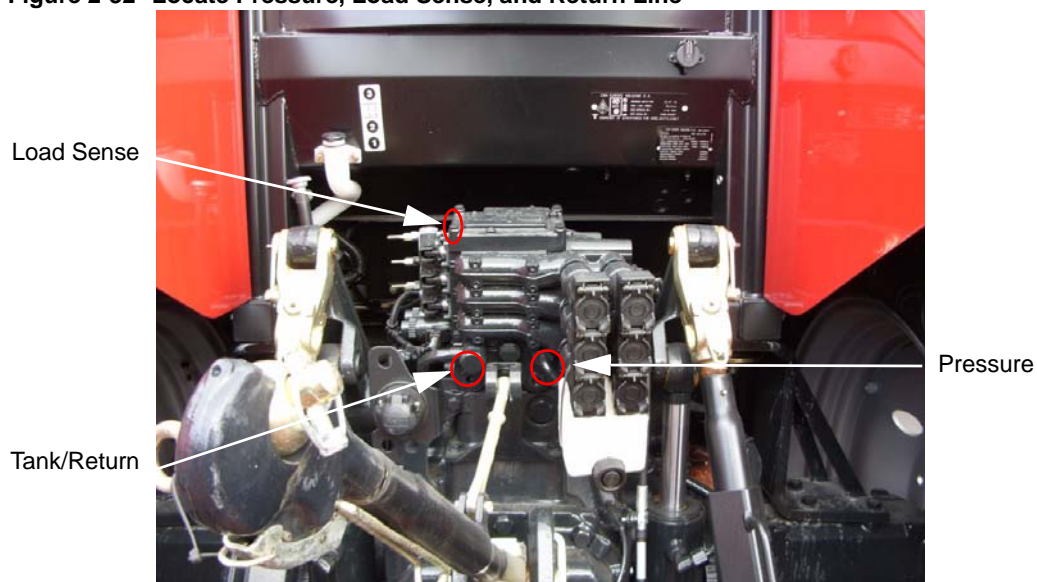


24. Double-check all hose connections and confirm they are connected correctly at both ends. The Tank/Return hose must be correctly connected to allow proper operation of the **LS** Relief Valve.
25. Tighten all hose connections at both ends.
26. Check that all hoses are connected to the correct ports at each hose end before starting the engine.
27. Turn on the engine momentarily (3-4 seconds) then turn off the engine.
28. Check for oil leaks.
29. Turn the engine on long enough to enable you to turn the steering wheel one turn right and one turn left.
30. Turn the engine off.
31. Check for oil leaks.

Small Frame

1. Find the following Power Beyond ports on the rear valve stack. See *Figure 2-32*.
 - Pressure has a 10 mm hex socket.
 - Load Sense has a 5mm hex socket.
 - Tank/Return has a 12 mm hex socket.

Figure 2-32 Locate Pressure, Load Sense, and Return Line



2. Find the Load Sense port, which has a 5mm hex socket. See *Figure 2-33*.

Figure 2-33 Locate Load Sense



3. Open the hood by pulling the latch and raising the hood. See *Figure 2-34*.

Figure 2-34 Open Hood



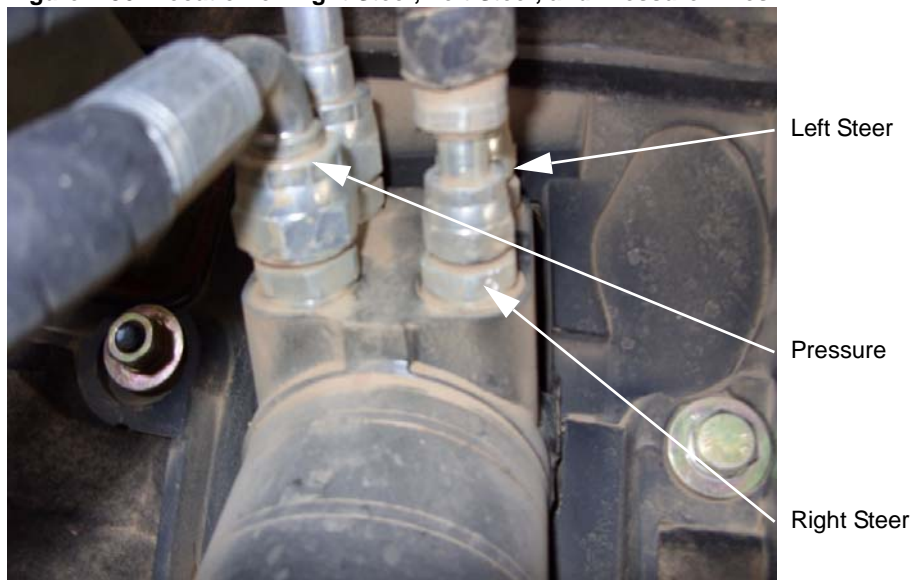
4. Find the Left Steer and Right Steer lines, which are on the left-hand side of the tractor beneath the hood. See *Figure 2-35*.

Figure 2-35 Left and Right Steer Lines



5. Find the Pressure line and Left Steer and Right Steer lines on the Orbitrol. See *Figure 2-36*.

Figure 2-36 Location of Right Steer, Left Steer, and Pressure Lines



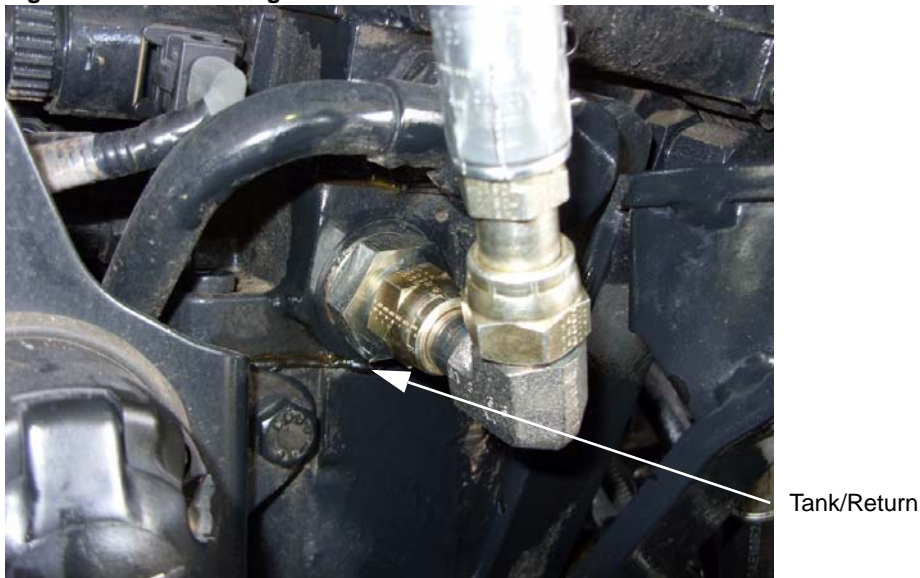
6. Remove plug from Pressure port using a 10mm Allen wrench. See *Figure 2-37*.
7. Connect a long 3/8" hose (the PRESSURE hose) to the **P port** on the Power Beyond. You must use a M22metric to -8 ORFS male adapter to connect this hose to the Power Beyond. Then route the hose under the cab to the Steering Valve. See *Figure 2-37*.

Figure 2-37 Connecting to Pressure



8. Remove the plug from Return Line using a 12mm Allen wrench. See *Figure 2-38*.
9. Connect a short 3/8" hose (the TANK hose) from the **TANK port** on the Steering Valve to the **T port** on the Power Beyond. You must use a M27 metric to -8 ORFS male adapter and an elbow to connect the end of the hose to the Power Beyond. Then route the hose under the cab to the Steering Valve. See *Figure 2-38*.

Figure 2-38 Connecting to Tank/Return



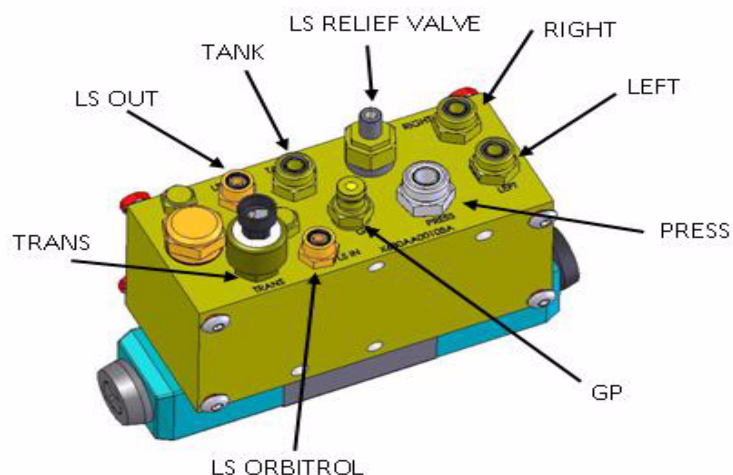
10. Remove plug from load sense using a 5mm Allen wrench. See *Figure 2-39*.
11. Connect the LS OUT hose to the **LS port** on the Power Beyond. You must use a M12metric to -6 ORFS male elbow adapter to connect the end of the hose to the Power Beyond. Then route the hose under the cab to the Steering Valve. See *Figure 2-39*.

Figure 2-39 Connecting to Load Sense



12. Connect the TANK hose from *Step 9* to the **TANK port** on the Steering Valve. See *Figure 2-40*.
13. Connect the LS OUT hose from *Step 11* to the **LS OUT port** on the Steering Valve. See *Figure 2-40*.
14. Connect the PRESSURE hose from *Step 7* to the **PRESS port** on the Steering Valve. See *Figure 2-40*.

Figure 2-40 Steering Valve Ports



15. Remove the Pressure, Steer Left, and Steer Right hoses from the Orbitrol. See *Figure 2-41*.
16. Connect a 1/4" hose (the LS ORBITROL hose) from the **LS ORBITROL port** on the Steering Valve to the **PRESSURE port** on the side of the tractor's steering unit (Orbitrol). You must install a run tee and a reducer before connecting the hose to the Orbitrol. See *Figure 2-41*.

Note: If you can't screw the hose back on because it is on the wrong angle follow the next three steps; if not proceed to *Step 20*.

Figure 2-41 Connecting Orbitrol Hoses



17. Loosen the fitting as shown in *Figure 2-42*.
18. Retry to screw in the hose from *Step 16*.
19. Re-tighten the fittings from *Step 17*. See *Figure 2-42*.

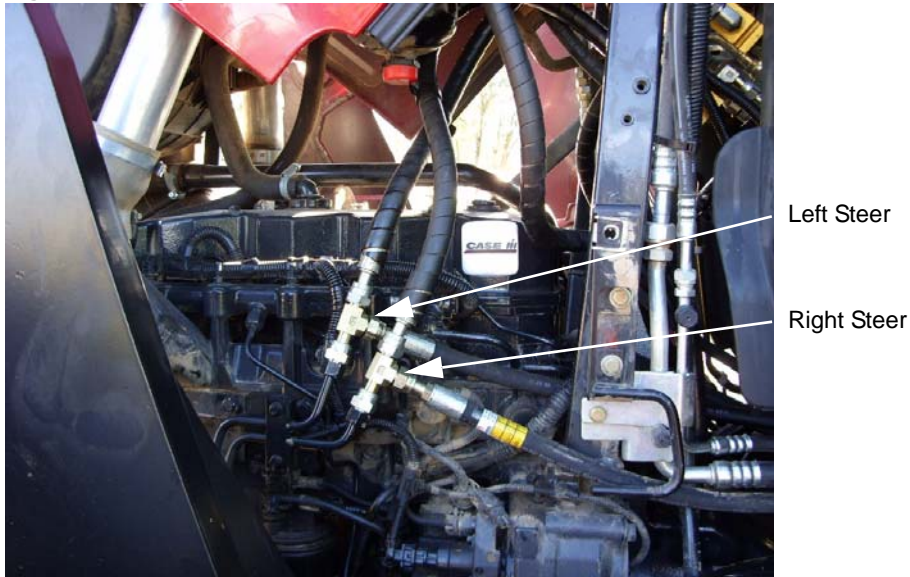
Note: Only complete the above steps if you could not complete *Step 16*.

Figure 2-42 Adjust Pressure Fitting



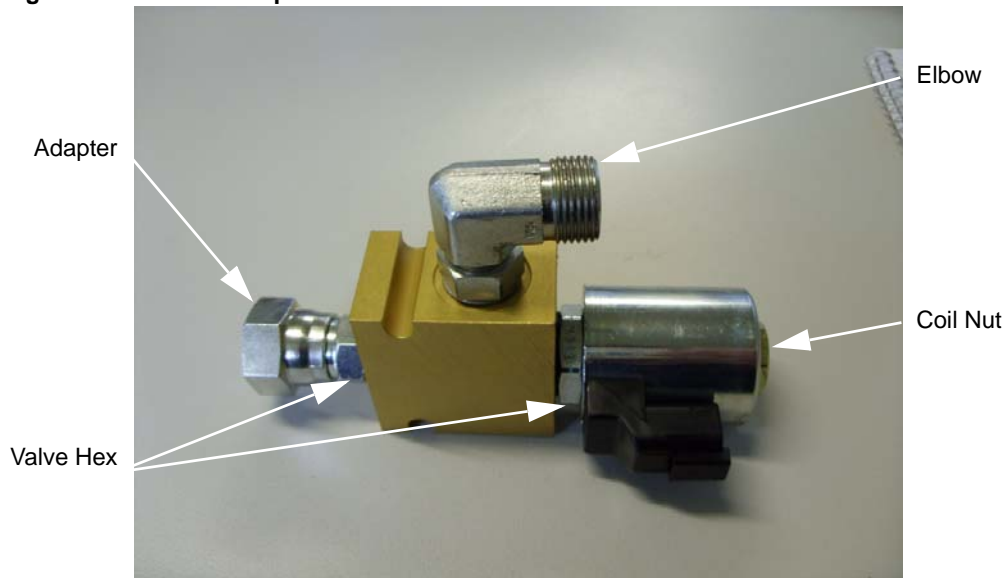
20. Connect the RIGHT hose from the **RIGHT port** on the Steering Valve to the **Right Steer Hose** on the tractor. You must install a run tee on the **Right Steer Hose** to allow the hose connection. See *Figure 2-43*.
21. Connect the LEFT hose from the **LEFT port** on the Steering Valve to the **Left Steer Hose** on the tractor. You must install a run tee on the **Left Steer hose** to enable the hose connection. See *Figure 2-43*.

Figure 2-43 Right and Left Steer Hoses



22. Prepare the two solenoid valves by attaching the adapters and elbows as shown in *Figure 2-44*. Confirm the valve hex is tight and the coil nut is firm.

Figure 2-44 Attach Adapters and Elbows



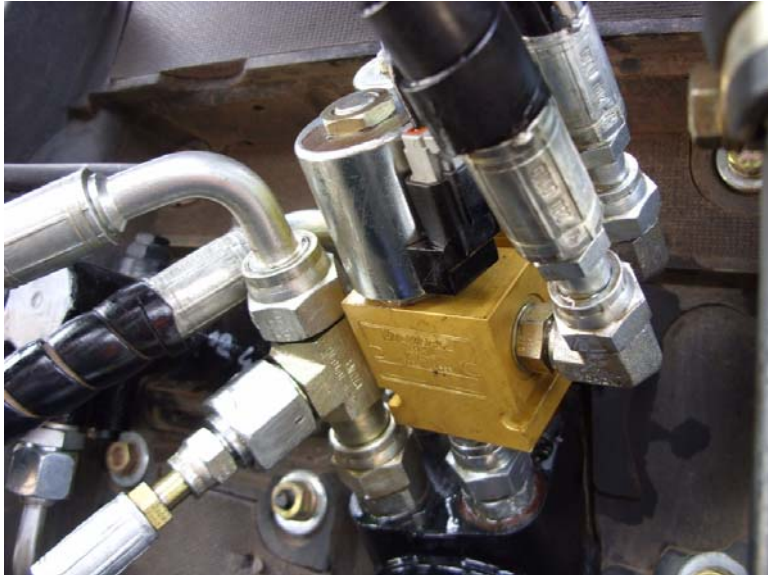
23. Place one solenoid assembly directly on to the **L port** on top of the steering unit (Orbitrol) and connect the Left Steer line into the other side of the solenoid assembly. See *Figure 2-45*.

Figure 2-45 Attach One Solenoid onto L Port



24. Place the second solenoid assembly directly on to the **R port** on top of the steering unit (Orbitrol) and connect the Right Steer line into the other side of the solenoid assembly. See *Figure 2-46*.

Figure 2-46 Attach Second Solenoid onto R Port

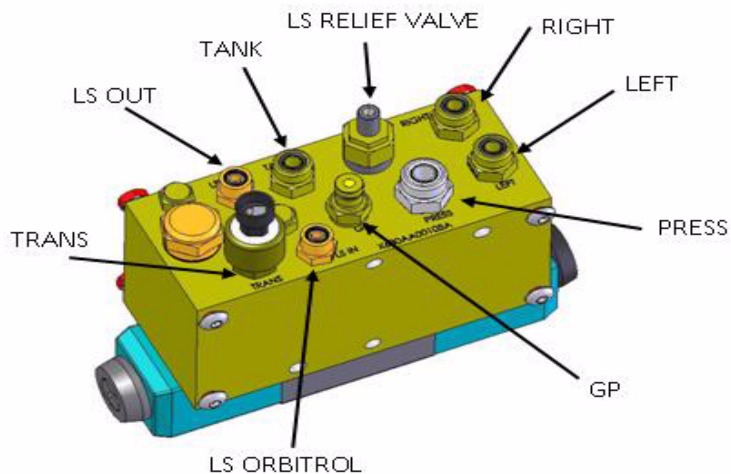


25. Double-check all hose connections and confirm they are connected correctly at both ends. The Tank/Return hose must be correctly connected to allow proper operation of the **LS** Relief Valve.
26. Tighten all hose connections at both ends.
27. Check that all hoses are connected to the correct ports at each hose end before starting the engine.
28. Turn on the engine momentarily (3-4 seconds) then turn off the engine.
29. Check for oil leaks.
30. Turn the engine on long enough to enable you to turn the steering wheel one turn right and one turn left.
31. Turn the engine off.
32. Check for oil leaks.

Adjust the Relief Valve

The AutoSteer steering valve has a built-in Load Sense Relief Valve that limits the maximum pump pressure when using the AutoSteer system. The Relief Valve must be adjusted after you have completed the hydraulic installation and before you turn on the AutoSteer system. See *Figure 2-47*.

Figure 2-47 Steering Valve Ports



1. Remove the Relief Valve cover by removing the four screws with a 3/16" Allen wrench.
2. Install a 5000 psi pressure gauge on the Steering Valve diagnostics port labeled as **GP**. Use a short extension hose on the pressure gauge if necessary for easier reading.
3. Put transmission into "neutral" or "park" position and turn on the hand brake.
4. Start the engine and leave it at low idle.

5. Immediately check for oil leaks on all hose connections that were opened. See *Figure 2-48*.

Figure 2-48 Relief Valve

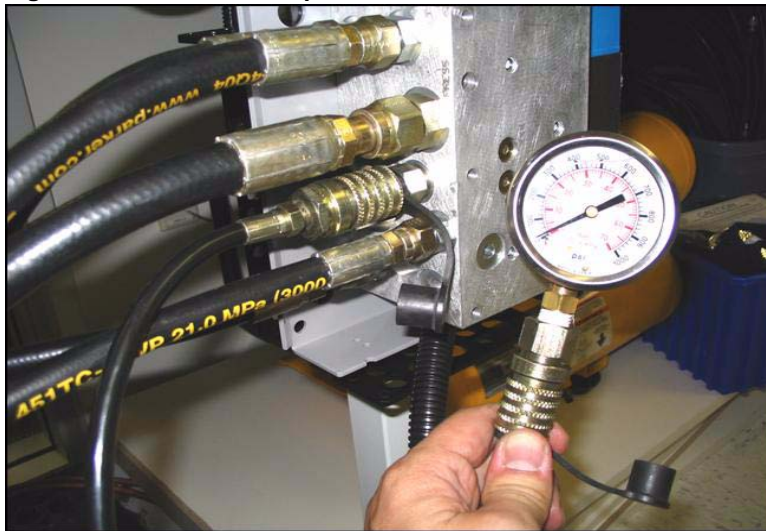


6. Turn the steering wheel full right and then full left and check for correct manual steering response. Immediately check for oil leaks on all hose connections that were opened. Air in the hoses may cause a slight steering delay when the system is first powered up.

7. Observe the standby pump pressure shown on your pressure gauge. Standby pressure should be low or around 350psi. If standby pump pressure is zero, less than 100psi, or very high, such as 3000psi, you might have a plumbing error. A high pressure could indicate Pressure and Tank hoses inverted, but before starting to troubleshoot this, be aware other functions on the tractor can also cause the pressure to go high, such as lifting the hitch or activating a remote valve. See *Figure 2-49*.

Note: On this vehicle, turning the steering wheel should not affect the pressure read on the gauge connected to the block. To read the manual steering pressure, the gauge would have to be teed into the Pressure line to the Orbitrol.

Figure 2-49 Observe Pump Pressure



8. Clear any bystanders from around the tractor because you will be moving the front wheels in the next step.
9. Press the right or left manual override button on the end of the Steering Valve. The front wheels will turn towards the stops. Maximum pump pressure will be indicated on the pressure gauge when the wheels hit the stops. See *Figure 2-50*.

Figure 2-50 Steering Valve Override



10. Adjust the Relief Valve using a 5/32" Allen wrench and a 1/2" wrench, so the maximum pump pressure is 2500psi when the wheels hit the stops. See *Figure 2-51*.

Figure 2-51 Adjust Relief Valve



- 11.** Tighten the jam nut on the relief valve once the correct pressure setting has been adjusted. See *Figure 2-51*.
- 12.** Remove pressure gauge by sliding the sleeve on the quick coupler.

Wheel Angle Sensor (WAS) Installation

This **Wheel Angle Sensor Installation** chapter information is provided in the following sections:

- *Installing Mounting Brackets*
 - *Vehicles without Mud Flaps*
 - *Vehicles with Mud Flaps*
- *Cut the Wheel Angle Sensor Rods to Length*
- *Assemble the Linkage Rod Hardware*
- *Attach the Wheel Angle Sensor Rods to Brackets and Adjust*

Note: The Wheel Angle Sensor is optional equipment and is not provided with the installation kit. The Wheel Angle Sensor installation instructions are provided for special installations, when required.

If additional on-line performance is required, a Wheel Angle Sensor is available for this vehicle. The decision to use this option are left up to the installer and customer.

Installing Mounting Brackets

Look to see if your vehicle has mud flaps; then install the mounting brackets as follows:

- *Vehicles without Mud Flaps*
- *Vehicles with Mud Flaps*

Vehicles without Mud Flaps

1. Identify the Wheel Angle Sensor mounting location on the front right steering axle.
2. Use two spacers and two bolts to attach the Wheel Angle Sensor bracket as shown in *Figure 3-1*.

Note: The length of the spacers are 1" and 1-3/4" (the 1-3/4" is made up of a 1" and a 3/4" on top of each other) and the length of the M12 bolts is 45mm and 60mm.

Figure 3-1 Install Wheel Angle Sensor Bracket



3. Orientate the Wheel Angle Sensor as shown in *Figure 3-2*. The plug is facing the rear of the vehicle.

Figure 3-2 Wheel Angle Sensor Orientation



4. Secure the sensor to the bracket using a 9/16" socket and ratchet on the two bolts provided. See *Figure 3-3*.

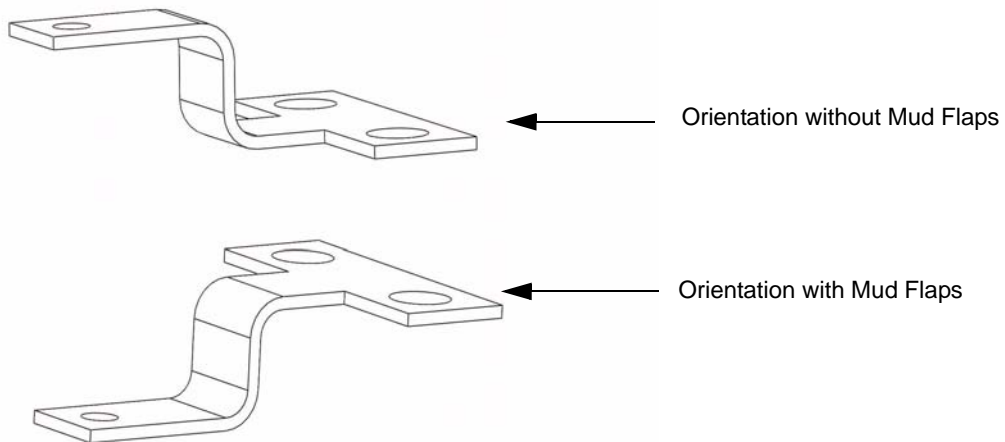
Figure 3-3 Wheel Angle Sensor Bracket Bolted



5. Orientate the linkage bracket as shown in *Figure 3-4*.

Note: The same bracket is used for vehicles with and without mud flaps. The top one is for use on vehicles without mud flaps and the bottom one is for use on vehicles with mud flaps.

Figure 3-4 Orient the Linkage Bracket



6. Attach the linkage bracket to the wheel hub using the two M16x20mm bolts and washers. Tighten them with a 24mm socket and ratchet. See *Figure 3-5*.

Figure 3-5 Linkage Bracket



Vehicles with Mud Flaps

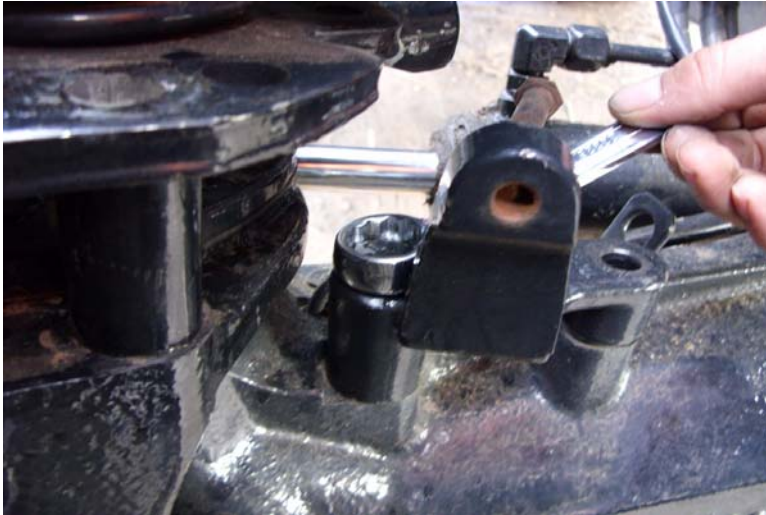
1. Identify the Wheel Angle Sensor mounting location on the front right steering axle. See *Figure 3-6*.

Figure 3-6 Identify Wheel Angle Sensor Mounting Location



2. Remove the two bolts from the mud flap stop using a 19mm socket and ratchet. See *Figure 3-7*.

Figure 3-7 Remove Bolts from the Mud Flap Stop



3. Attach the Wheel Angle Sensor bracket on top of the mud flap stop. Tighten them with a 19mm socket and ratchet. See *Figure 3-8*.

Note: On vehicles fitted with a suspended axle, use a 3/4" spacer in between the Wheel Angle Sensor bracket and the mud flap bracket.

Figure 3-8 Install Wheel Angle Sensor Bracket on Mud Flap Stop



4. Orientate the Wheel Angle Sensor as shown. The plug is facing the rear of the vehicle. See *Figure 3-9*.

Figure 3-9 Wheel Angle Sensor Orientation



5. Secure the sensor to the bracket using a 9/16" socket and ratchet on the two bolts provided. See *Figure 3-10*.

Figure 3-10 Wheel Angle Sensor Bracket Bolted



6. Remove the front two bolts that retain the mud flap using a 24mm wrench. See *Figure 3-11*.

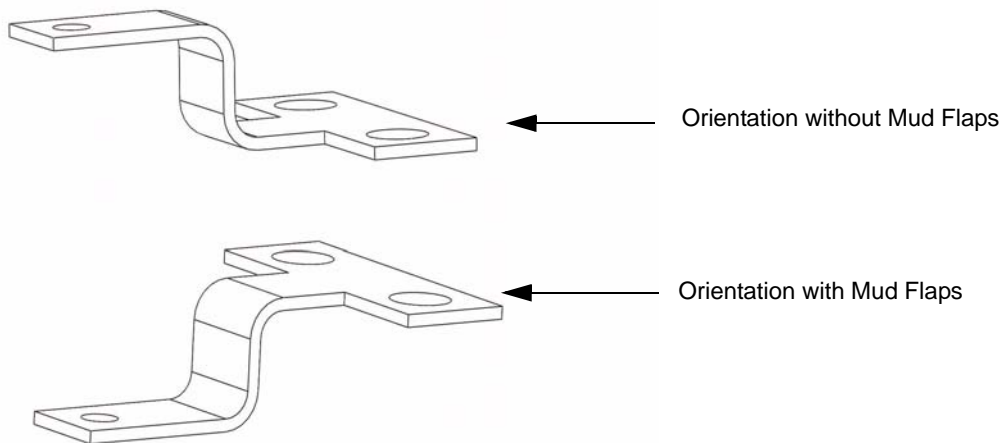
Figure 3-11 Remove Front Bolts from the Mud Flap Stop



7. Orientate the linkage bracket as shown in *Figure 3-12*.

Note: The same bracket is used for vehicles with and without mud flaps. The top one is for use on vehicles without mud flaps and the bottom one is for use on vehicles with mud flaps.

Figure 3-12 Orient the Linkage Bracket



8. Attach the linkage bracket to the wheel hub as shown in *Figure 3-13* using the two original bolts. Tighten them with a 24mm socket and ratchet.

Figure 3-13 Linkage Bracket



Cut the Wheel Angle Sensor Rods to Length

The Wheel Angle Sensor rods are shipped longer than they need to be. These rods must be cut to the proper length to allow the linkage rods to provide the Wheel Angle Sensor the maximum number of counts as the steering wheel is turned from full right to full left. Due to the variability of the possible mounting positions and axle options, it is left to the installer to verify the correct length for each individual installation and to cut the rods to length.

Table 3-1 provides the typical rod lengths that work for most installations. Before cutting the linkage rods to these measurements, verify that the Wheel Angle Sensor brackets can attach to the vehicle as shown in this manual and that they are attached the correct distance from any reference points shown. If the axle does not allow the Wheel Angle Sensor brackets to be installed as shown, do not cut the rods until it is determined what the proper lengths are for your installation. Due to possible variations in the mounting positions, these measurements could be different. These measurements are provided as a reference only. The installer is responsible for verifying that the provided measurements will work prior to cutting the rods.

Use a metal hack saw and vice, as shown in *Figure 3-15*, to cut the Wheel Angle Sensor linkage rods to the proper lengths.

Note: It is advisable to attach a nut on the side of the metal rod that is going to be kept in order to clean the threads after the cut has been made.

Protect the threads from damage while cutting the rods. *Figure 3-14* shows where the measurements provided in *Table 3-1* are measured from.

Table 3-1 Linkage Rod Cut Lengths

Item	Length
Rod A	2.18 inches (55mm)
Rod B	8.98 inches (228mm)

Figure 3-14 Linkage Rod Cut Length Measurement Points

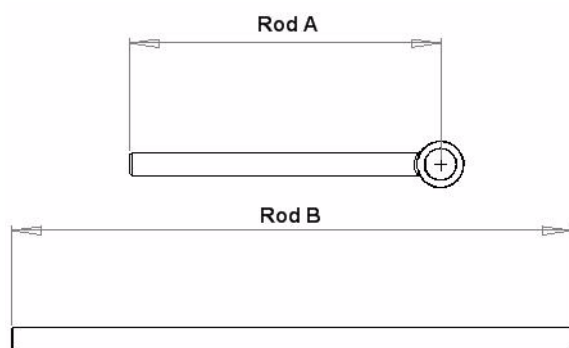
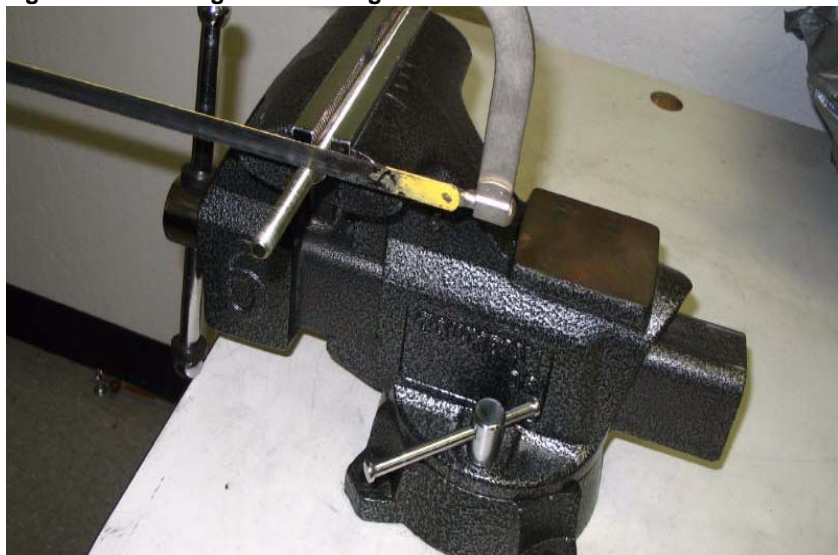


Figure 3-15 Linkage Rod Cutting

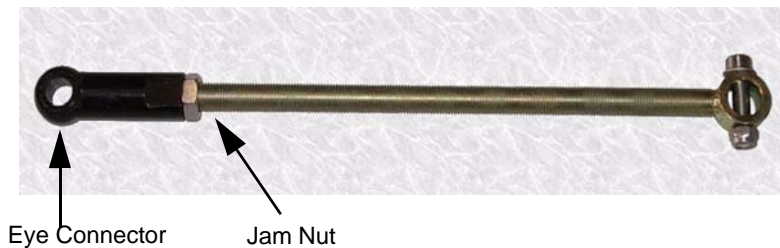


Note: The “after-assembly” center-to-center lengths of each linkage rod are shown in *Table 3-2*. *Figure 3-18* shows the measurement points for the assembled linkage rods.

Assemble the Linkage Rod Hardware

1. Attach a jam nut to the end of Rod A.
2. Connect the eye connector to the end of the Wheel Angle Sensor rod as shown in *Figure 3-16*.

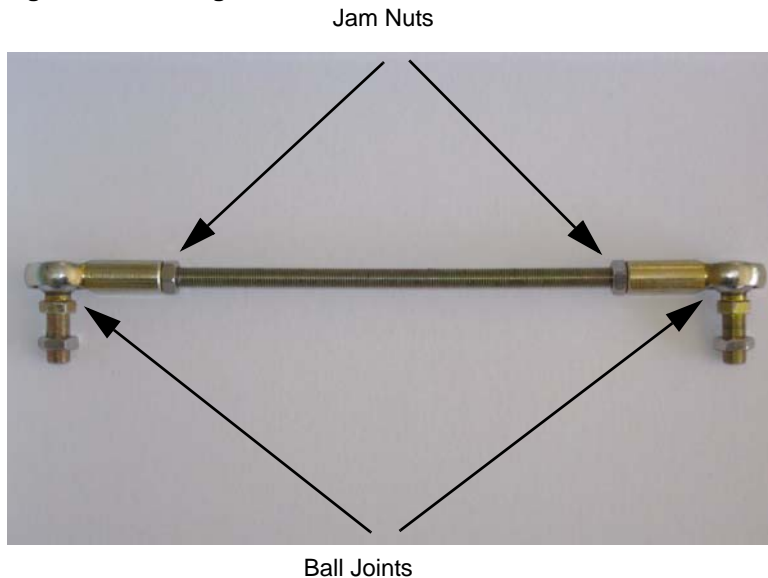
Figure 3-16 Rod A Assembled



3. Attach the jam nuts to each end of the linkage Rod B.
4. Attach the ball joints to both ends of the linkage rod as shown in *Figure 3-17*.

Note: The bolts for the ball joints should be facing the same direction as shown in *Figure 3-17* for this installation.

Figure 3-17 Linkage Rod Assembled

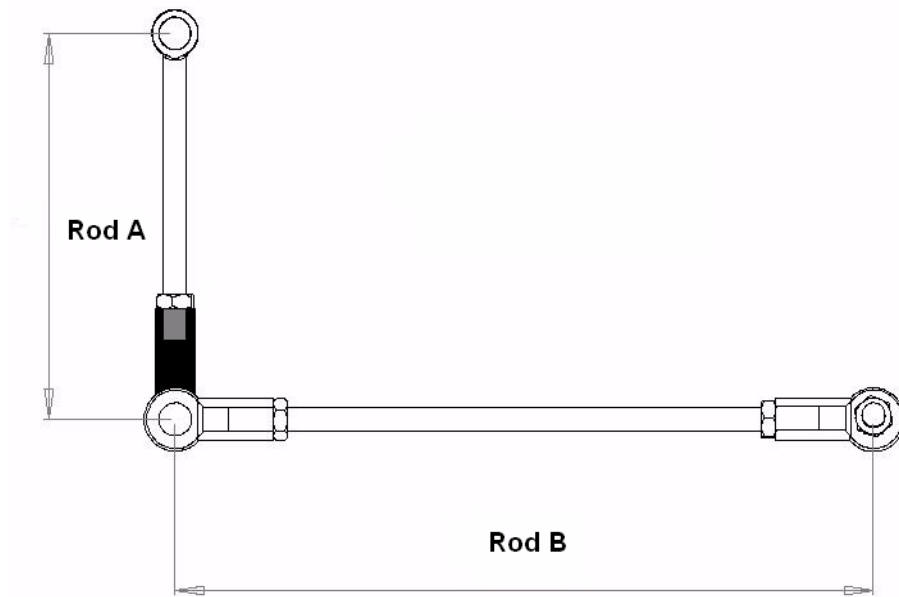


5. For most installations, use *Table 3-2* to adjust the lengths of the rod assemblies to the values shown. *Figure 3-18* shows where the measurement points for each rod are taken. Due to the variation of axle types and installation points, these measurements are provided as a reference only. Before connecting the steering rods and turning the steering axle verify that these lengths will work and the sensor will not be damaged.

Table 3-2 Assembled Linkage Rod Length

Item	Length
Rod A	3.31 inches (84mm)
Rod B	11.14 inches (283mm)

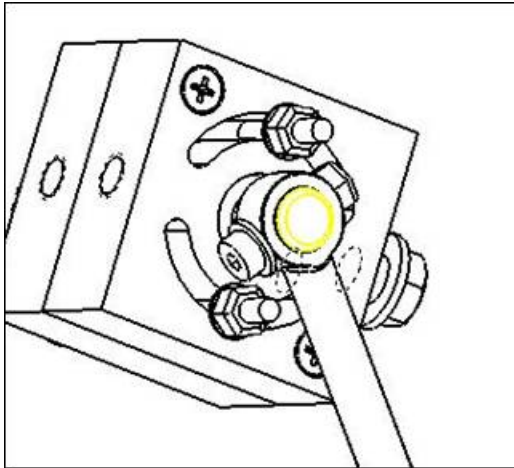
Figure 3-18 Assembled Linkage Rod Measurement Points



Attach the Wheel Angle Sensor Rods to Brackets and Adjust

1. Attach the Wheel Angle Sensor rod to the Wheel Angle Sensor. See *Figure 3-19*.

Figure 3-19 Attach Wheel Angle Sensor Rod to Sensor



Note: The flat washer goes on the bolt head side and NOT the nut side when attaching the linkage rod. See *Figure 3-20*.

Figure 3-20 Place the Washer on Bolt Head Side



2. Tighten the Wheel Angle Sensor rod with a 3/8" wrench and 1/8" Allen wrench. See *Figure 3-21*.

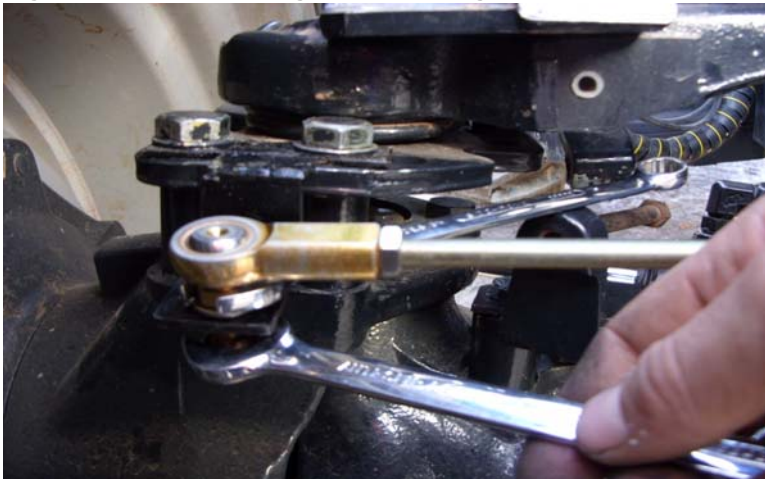
Figure 3-21 Tighten Wheel Angle Sensor Rod Connection




Note: The rod should aim toward the front of the vehicle.

3. Attach the linkage rod to the linkage bracket and tighten the ball joint to the bracket with a 1/2" and 9/16" wrench. See *Figure 3-22*.

Figure 3-22 Attach Linkage Rod to Linkage Bracket



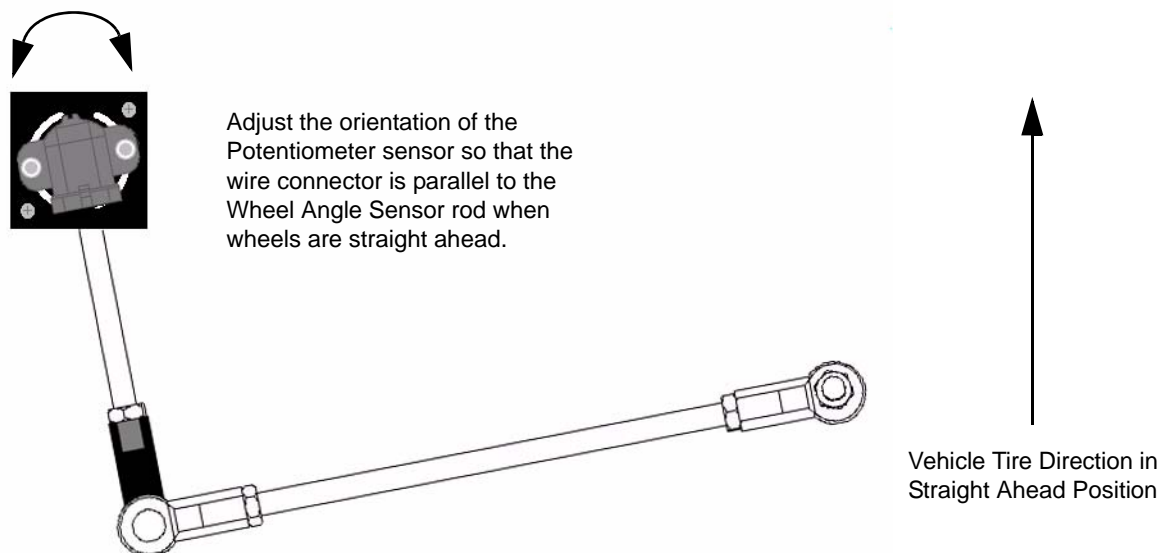
	<p style="text-align: center;">⚠ WARNING</p> <p>Always shut down the vehicle when working around the steering axle and checking and adjusting the Wheel Angle Sensor rod lengths. The steering axle could move suddenly and cause severe injury or death.</p>
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Note: Never attach the linkage rods to Wheel Angle Sensor rod and turn the steering wheels manually or automatically until the fit has been verified. The linkage rods must remain apart while the steering wheels are turned to the maximum right and left positions and then temporarily attached at these positions. Failure to do this may cause the Wheel Angle Sensor or vehicle to become damaged.

Note: After the linkage rods are assembled in the following steps, they should move freely without touching any other parts and without overextending. Make any necessary adjustments to the linkage rods if there is an interference problem.

4. With the linkage rods disconnected, manually turn the steering wheel so that the wheels are centered (the vehicle will travel straight ahead when moving).
5. Temporarily attach the linkage rods.
6. Rotate the Wheel Angle Sensor potentiometer on top of the mounting block so that the plastic wire connector is parallel to the Wheel Angle Sensor rod. See *Figure 3-23*.

Figure 3-23 Adjust Potentiometer Angle to Match Straight Ahead



7. After the potentiometer has been adjusted, tighten the potentiometer bolts with a 3/8" wrench and 5/32" Allen wrench.
8. Disconnect the linkage rods and turn the steering wheel manually to the full left position.
9. Reattach the linkage assembly and verify that the sensor or rods will not be damaged. Adjust the rod lengths as necessary. See *Figure 3-24*.

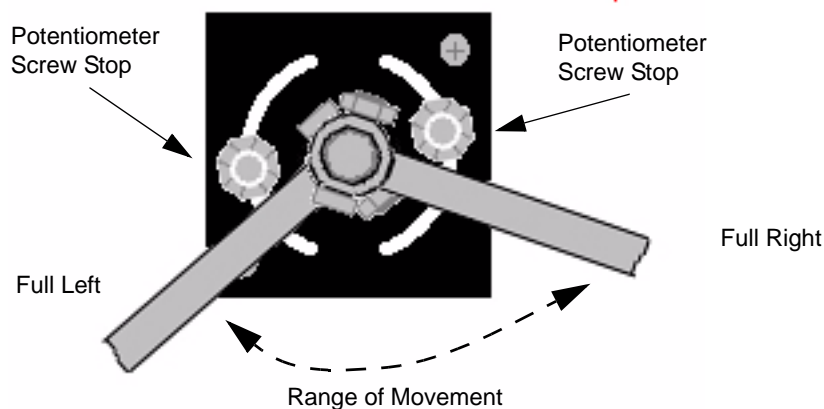
Figure 3-24 Reattaching Linkage Assembly



10. Repeat Step 4 through Step 9 until the rod lengths have been adjusted and the potentiometer is centered to get the maximum sensor movement. The maximum movement is reached when the Wheel Angle Sensor rod will sweep from approximately 3/16 inch (5mm) from both bolt heads holding the potentiometer on to the block when the wheels are turned to the maximum right and left positions. See *Figure 3-25*.

Figure 3-25 Maximum Sensor Movement

Wheel Angle Sensor as Seen from the Bottom



Note: An Ohm meter can also be used to determine if there is enough sensor movement. Connect the Ohm meter to pins A and B of the Wheel Angle Sensor. Measure the Ohm reading at the maximum left and right position. After subtracting the smaller number from the larger number, there should be at least a 3.75 kilohms change. The reading should also never go below 1.6 or higher than 6.6 kilohms as this is reaching the limits of the potentiometer and could damage the sensor.

11. Once all the adjustments are complete, tighten all lock nuts and bolts on the linkage and Wheel Angle Sensor rod. A 1/2" and two 9/16" wrenches are required to tighten all the connections. See *Figure 3-26*.

Figure 3-26 Tighten all Nuts and Bolts



SA Module Installation

The **SA Module Installation** chapter contains information in the following sections:

- *SA Module Mounting Orientation*
- *Mount the SA Module*
 - *Preferred Location*
 - *Large Frame Location*
 - *Small Frame Location*

SA Module Mounting Orientation

The SA Module can also only be mounted in certain orientations. *Figure 4-1* shows the correct mounting positions and *Figure 4-2* shows incorrect mounting positions.

Figure 4-1 Correct SA Module Mounting Orientations

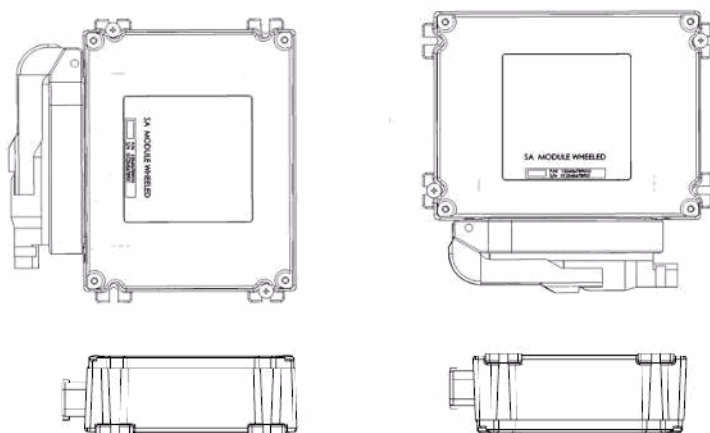
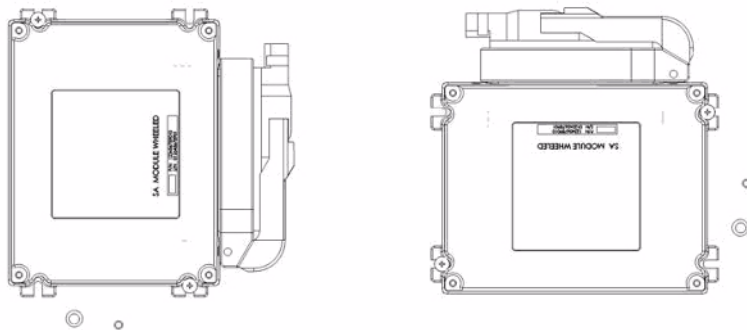


Figure 4-2 Incorrect SA Module Mounting Orientations



Mount the SA Module

Due to the variety of options available on vehicles and the possible configuration differences, it may be necessary to install the SA Module in a location other than the example shown here. If an alternative location is required, choose a location where the SA Module can be protected from damage, from moving parts or crop debris, and excessive moisture from weather and cleaning equipment.

There are three possible mounting locations:

- *Preferred Location*
- *Large Frame Location*
- *Small Frame Location*

Preferred Location

The preferred mounting location is to install the SA Module inside the cab as follows.

1. Prepare the SA Module Bracket for installation by attaching two screws on the “L” bracket side of the bracket. See *Figure 4-3*.

Note: Do not tighten screws. Allow room for the SA Module to fit beneath them in a later step.

Figure 4-3 Attach Screws to Bracket “L”-side



2. Look inside the cab at the plastic panel behind the seat. Identify the compartment inside the rear of the cab and remove the four retaining screws from the cover. See *Figure 4-4*.

Note: One of the screws is underneath the rubber flooring.

Figure 4-4 Remove Retaining Screws



3. Remove the cover to reveal the space for the SA Module. Attach the SA Module bracket using two 8mm bolts, nuts and washers. Tighten them with a 13mm socket and 13mm wrench. See *Figure 4-5*.

Note: Before trying to install the SA Module, make sure there is enough room; when there are two ECU/modules side-by-side in this space, the SA Module will not fit and you will have to use one of the other locations instead.

Figure 4-5 Attach SA Module Bracket



4. Attach the SA Module Harness to the SA Module. See *Figure 4-6*.

Figure 4-6 Attach SA Module Harness to SA Module



5. Slide the SA Module into place. Mount it by installing the other two screws and tighten all four with a #2 stubby Phillips screwdriver. See *Figure 4-7*.

Figure 4-7 Slide SA Module into Place



6. Replace the compartment cover and tighten the four retaining screws using a #2 stubby Phillips screwdriver. See *Figure 4-4*.

Large Frame Location

A second option is to install the SA Module on back of the vehicle as follows.

1. Prepare the SA Module Bracket for installation by attaching two screws on the “L” bracket side of the bracket. See *Figure 4-8*.

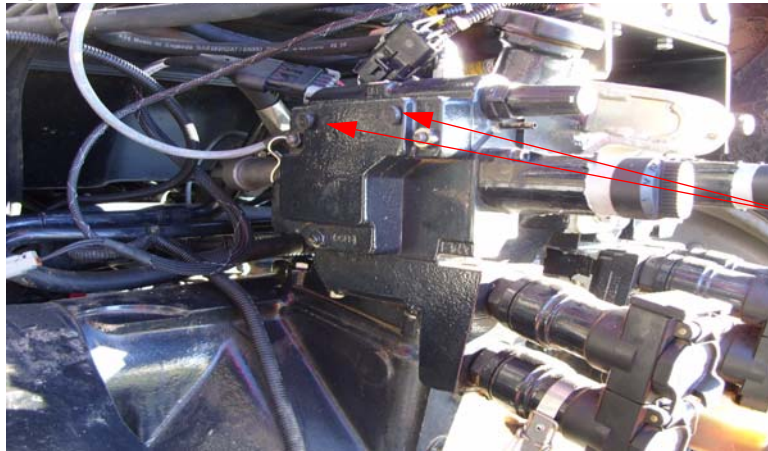
Note: Do not tighten screws. Allow room for the SA Module to fit beneath them in a later step.

Figure 4-8 Attach Screws to Bracket “L”-side



2. Identify the back of the vehicle. See *Figure 4-9*.

Figure 4-9 Vehicle Rear SA Module Bracket Location



Valve Stack Rubber Plugs

3. Remove the two rubber plugs from the left-hand side of the valve stack. See *Figure 4-10*.

Figure 4-10 Remove Rubber Plugs



4. Attach the SA Module bracket as shown in *Figure 4-11* using two 8mm bolts and washers. Tighten with a 13mm socket.

Note: Two washers can also be placed on each bolt between the bracket and the valve stack to align the bracket into a vertical position.

Figure 4-11 Attach SA Module Bracket (Large Frame)



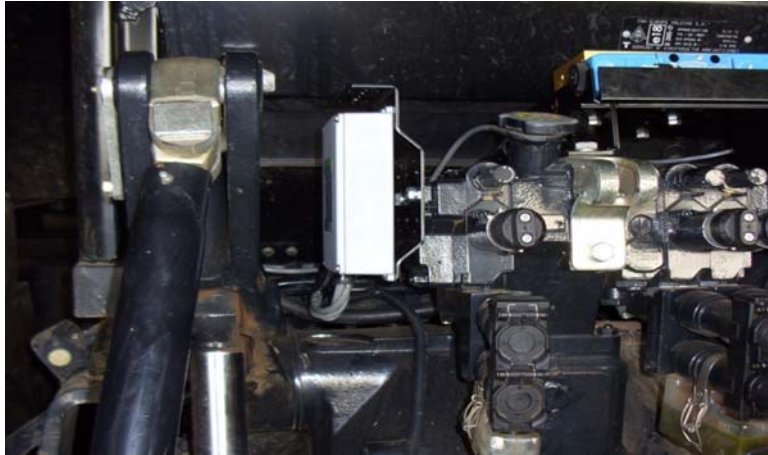
5. Attach the SA Module Harness to the SA Module. See *Figure 4-12*.

Figure 4-12 Attach SA Module Harness to SA Module



6. Slide the SA Module into place. Mount it by installing the other two screws and tighten all four with a #2 Phillips screwdriver. See *Figure 4-13*.

Figure 4-13 Slide SA Module into Place (Large Frame)



Small Frame Location

A third option is to install the SA Module on top of the rear valve as follows.

1. Prepare the SA Module Bracket for installation by attaching two screws on the “L” bracket side of the bracket. See *Figure 4-14*.

Note: Do not tighten screws. Allow room for the SA Module to fit beneath them in a later step.

Figure 4-14 Attach Screws to Bracket “L”-side



2. Identify the rear valve area on the back of the vehicle. See *Figure 4-15*.

Figure 4-15 Rear Valve SA Module Bracket Location



SA Module Bracket Location
(lies behind the valve stack)

3. Remove the two plastic cable clips to reveal two holes. Cable tie this harness further down so it is out of the way. See *Figure 4-16*.

Figure 4-16 Remove Plastic Cable Clips



4. Attach the SA Module bracket as shown using two 6mm bolts, two 6mm washers, two 8mm washers and two 6mm nuts. See *Figure 4-17*.

Note: A 6mm washer then an 8mm washer is to be placed on the bolt to stop the bolt head going through the hole.

Figure 4-17 Attach SA Module Bracket



5. Attach the SA Module Harness to the SA Module. See *Figure 4-18*.

Figure 4-18 Attach SA Module Harness to SA Module



6. Slide the SA Module into place. Mount it by installing the other two screws and tighten all four with a #2 stubby Phillips screwdriver. See *Figure 4-19*.

Figure 4-19 Slide SA Module into Place (Small Frame)





Roof Module Installation

This **Roof Module Installation** chapter contains information in the following sections:

- *Safety Notes*
- *Roof Rail Installation*

Safety Notes

- The AutoSteer system must be powered OFF when installing or removing the Roof Module.
- The Roof Module must always be firmly secured to the Roof Rail using the hardware whenever the vehicle is in operation to prevent the Roof Module from releasing from its bracket and falling.
- The Roof Module must be removed when transporting the vehicle at speeds above 30 mph (48 km/h).
- Ensure you are in a stable position on the vehicle or ladder when removing the Roof Module, so that you do not fall or drop the Roof Module.
- Use a ladder to install the AutoSteer Roof Rail.

	<div data-bbox="667 1089 935 1134"> WARNING</div> <p data-bbox="440 1163 1071 1247">Ensure that you are in a stable position on the vehicle when installing or removing the Roof Rail and Roof Module so you do not fall.</p>
---	---

Roof Rail Installation

1. Place the ladder as close as possible to the side of the cab.

Note: The ladder is necessary to install the Roof Rail and Roof Module.

2. Locate the four bolts on the roof cab as shown in *Figure 5-1*.
3. Remove the four bolts with a #2 Phillips screw driver.

Note: The existing bolts will be replaced with longer ones and are no longer needed. Leave the flat washer on top of the rubber gasket.

Figure 5-1 Mounting Bolt Locations
Non Sunroof Models



Mounting Bolts

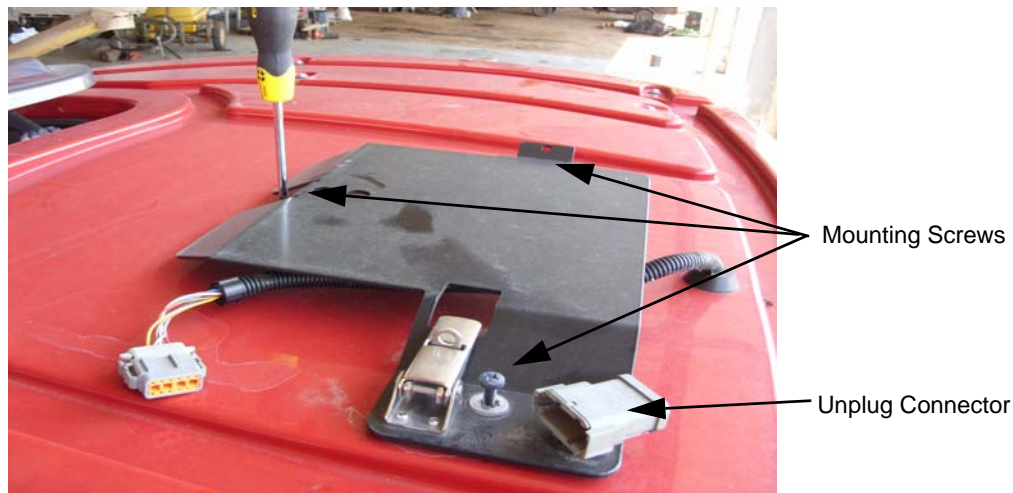
Sunroof Models



Mounting Bolts

4. Remove the three screws and washers retaining the factory roof module GPS receiver mount (if fitted) and unplug the connector as shown in *Figure 5-2*. Remove the bracket and re-install the screws with their washers.

Figure 5-2 Remove Factory Roof Module Mount



5. Install the Roof Rail spacers on top of the existing flat washers. See *Figure 5-3*.

Figure 5-3 Installing the Roof Rail Spacers



6. Place and orient the Roof Rail Brackets as shown in *Figure 5-4*.

Figure 5-4 Orienting the Roof Rail Brackets
Non Sunroof Models



Roof Rail Brackets

Sunroof Models



Roof Rail Brackets

7. Attach the Roof Rail Brackets using the longer bolts and washers supplied. Tighten securely with a 10mm socket and ratchet. See *Figure 5-5*.

Figure 5-5 Attach the Roof Rail Brackets



8. Attach the Roof Rail using the bolts, nuts and washers supplied. Tighten securely with a 15/16" socket and ratchet and a 15/16" open wrench. See *Figure 5-6*.

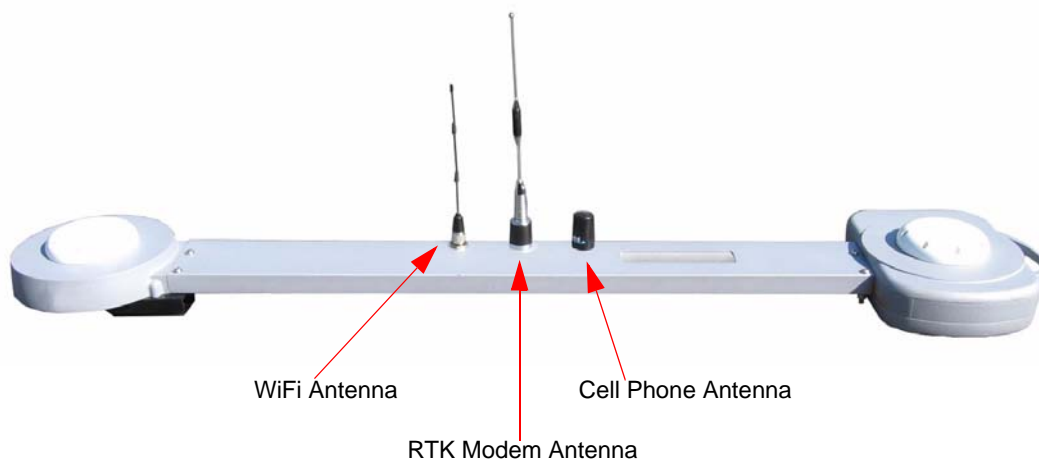
Figure 5-6 Attach the Roof Rail



9. Attach the three antennas to the proper Roof Module antenna connections. See *Figure 5-7*.

Note: Hand tighten the connections. Do not over tighten.

Figure 5-7 Attach the Antennas



10. Remove the Locking Pin from the Roof Rail. See *Figure 5-8*.

Figure 5-8 Remove Locking Pin



Locking Pin

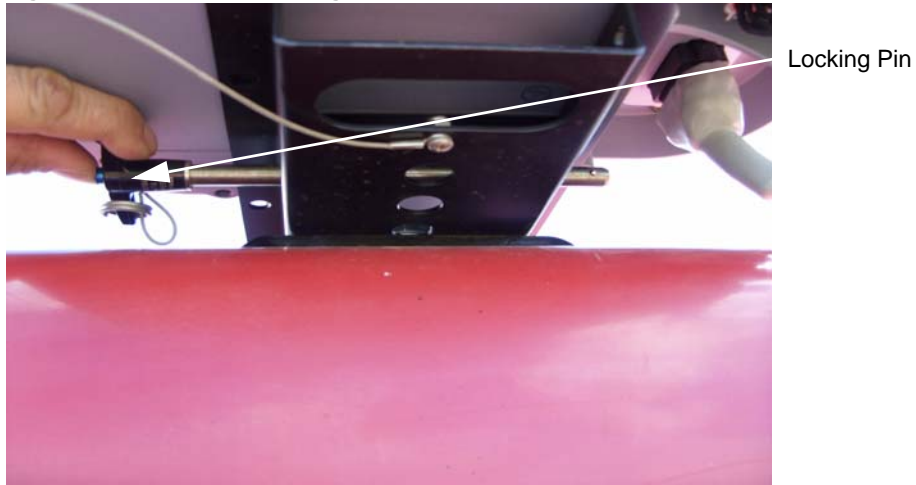
11. Place the Roof Module on the Roof Rail. See *Figure 5-9*.

Figure 5-9 Attach Roof Module



12. Reinsert the Locking Pin into the Roof Rail. See *Figure 5-10*.

Figure 5-10 Reinsert Locking Pin



Note: The Locking Pin can be inserted from either side of the Roof Rail.

13. The completed Roof Module should appear as shown in *Figure 5-11*.

Figure 5-11 Completed Roof Module Installation



Display Installation

This **Display Installation** chapter contains the following information:

- *Introduction*
- *Installation Procedure*

Introduction

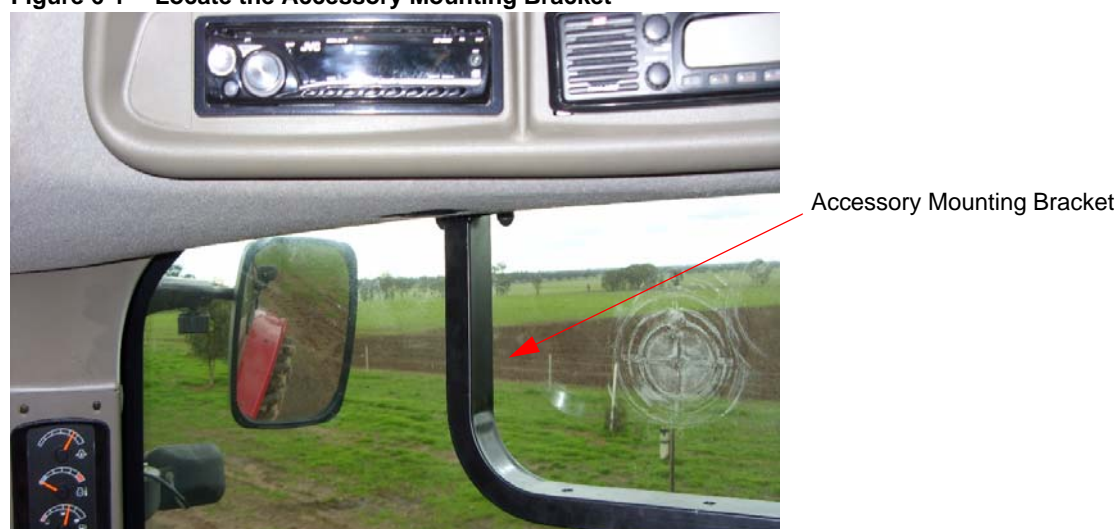
This chapter provides the instructions for installing the RAM Mount Ball in the cab so that the Display can be attached later. Refer to your Display user manual for instructions on installing the Display.

Installation Procedure

1. Locate the accessory mounting bracket on the right side of the cab. See *Figure 6-1*.

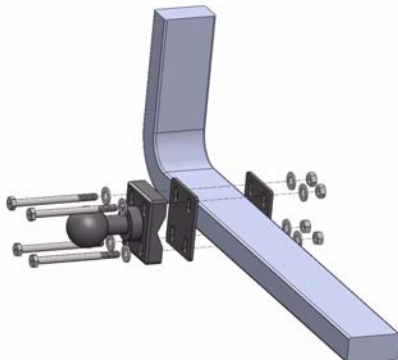
Note: Alternative mounting locations can be used if the location shown is not available.

Figure 6-1 Locate the Accessory Mounting Bracket



2. Insert the four bolts and washers into the RAM Ball and adapter plate, place that combination onto the accessory mounting bracket, and fit the other adapter plate on the back side (loosely fitted with a washer and nyloc nut). The resulting combination is shown in *Figure 6-2*.

Figure 6-2 Position RAM Ball Adaptor Plates on Accessory Mounting Bar



3. Tighten the nuts on the back-side plate evenly using a 10 mm socket and a 10 mm wrench. See *Figure 6-3*.

Figure 6-3 Tighten Nuts on Back Plate



4. Place rubber caps on the end of the bolt threads. See *Figure 6-4*.

Figure 6-4 Place Rubber Caps on Bolt Threads



Note: Refer to the Display user manual for the remaining Display-specific installation instructions.

Connecting System Cables

This **Connecting System Cables** chapter provides information for connecting the Main Cable Harness and the SA Module Cable Harness to the various vehicle and AutoSteer components in the following sections:

- *SA Module Harness*
 - *SA Module Connection*
 - *Wheel Angle Sensor Connection*
 - *Steering Valve Connection*
- *Main Cable Harness*
 - *Roof Module*
 - *Main Cable Harness Connections Inside Cab*
 - *SA Module Harness*
- *Power Supply Connection*
 - *Cab Power Connection*
 - *Battery Power Connection*

SA Module Harness

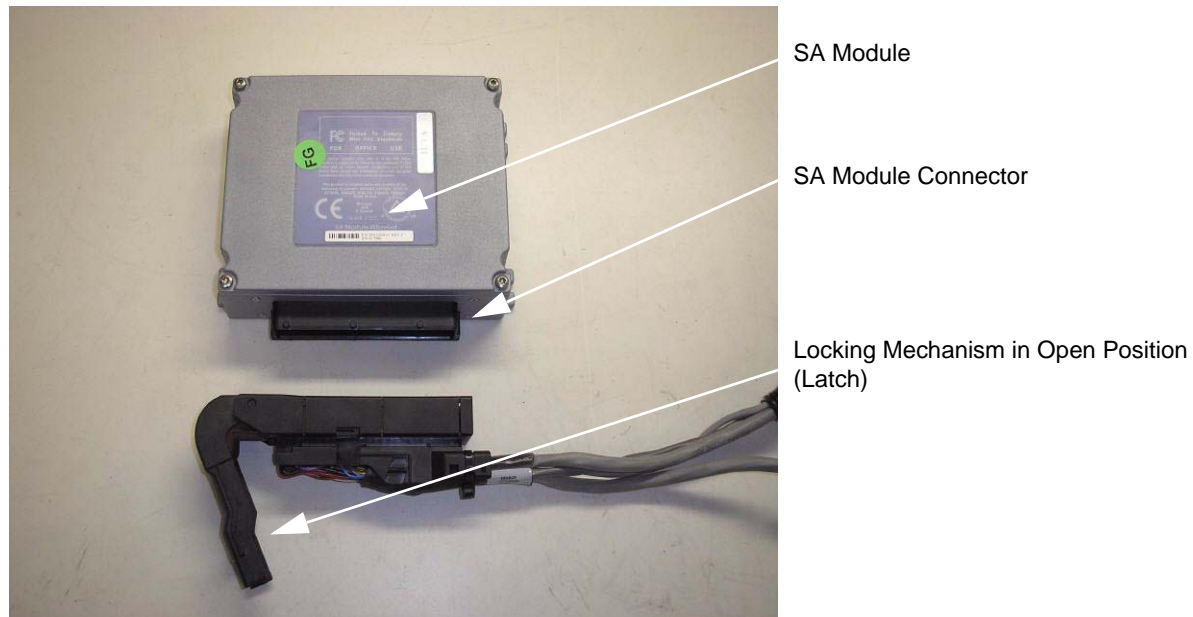
This **SA Module Harness** section contains the following sub-sections:

- *SA Module Connection*
- *Wheel Angle Sensor Connection*
- *Steering Valve Connection*

SA Module Connection

1. Align the SA Module Harness connector to the SA Module. See *Figure 7-1*.
2. Open the connector latch lever. See *Figure 7-1*.

Figure 7-1 Connecting SA Module Connector



3. Press the SA Module Harness connector onto the SA Module connector.

Note: You can damage the connectors if you force them into position. Do not force them together or use tools.

4. Press the latch lever closed until it clicks and locks the connector. See *Figure 7-2*.

Figure 7-2 Closing the SA Module Connector



Note: If you need to disconnect the SA Module connector, you must open the latch lever before attempting to pull the connectors apart.

5. Close the cable connector locking mechanism as shown in *Figure 7-3*.

Figure 7-3 SA Module Connector (closed).



Wheel Angle Sensor Connection

Note: This connection to the Wheel Angle Sensor is only required when using the AutoSteer Wheel Angle Sensor.

1. Route the Wheel Angle Sensor lead under the cab and along the side of the engine to the front axle. Secure with cable ties and connect the Wheel Angle Sensor lead to the Wheel Angle Sensor. See *Figure 7-4*.

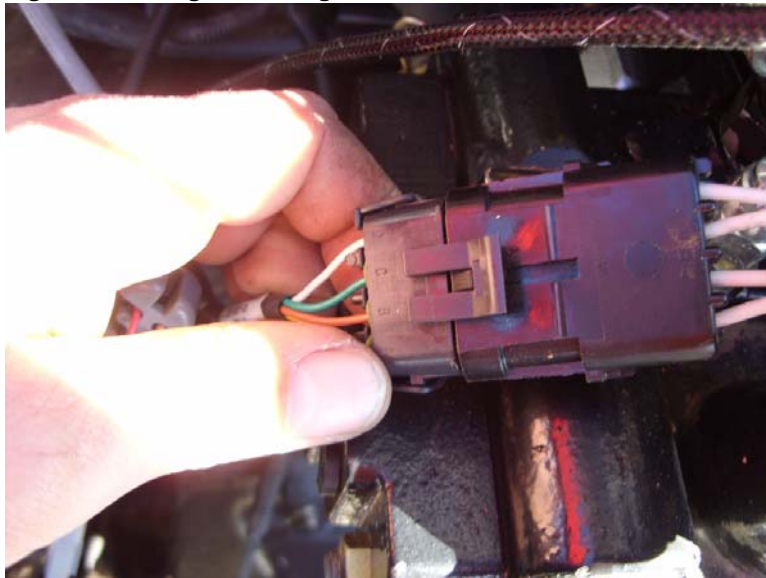
Figure 7-4 Connecting the Wheel Angle Sensor Plug



Steering Valve Connection

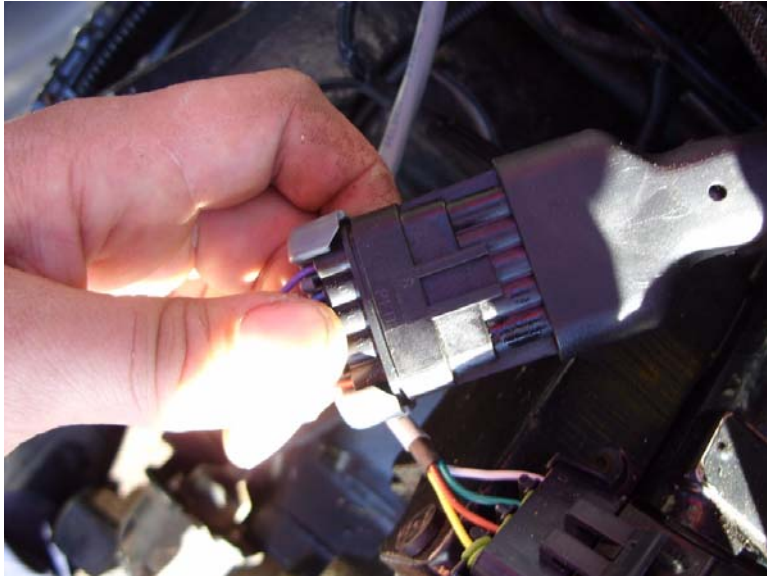
1. Plug in the steering harness connector from the Steering Valve (4-pin weather pack) into the SA Module Harness. See *Figure 7-5*.

Figure 7-5 Plug in Steering Harness Connector



2. Plug in the enable valve (10-pin Metripack) adapter harness plug into SA Module Harness. Locate the reactive steering harness (PN: 201-0480-01) and connect the 10-pin Metripack to the SA Module Harness. See *Figure 7-6*.

Figure 7-6 Plug in Enable Valve



Note: The short 10-pin Metripack to 3-pin Pressure Transducer harness that comes standard with the block is not used for this installation.

3. Plug the 3-pin Metripack connector into the Pressure Transducer on the Steering Valve. See *Figure 7-7*.

Figure 7-7 Plug Connector into Pressure Transducer



4. Route the two Deutsch plugs from the reactive steering harness (PN: 201-0480-01) to the Orbitrol and plug them into the solenoid valve fitted to the Orbitrol during the hydraulic installation. See *Figure 7-8*.

Figure 7-8 Plug in Deutsch Plugs into Valves



Main Cable Harness

This Main Cable Harness section contains the following sub-sections:

- *Roof Module*
- *Main Cable Harness Connections Inside Cab*
- *SA Module Harness*

Roof Module

1. Attach the Main Cable Harness to the Roof Module. See *Figure 7-9*.

Orient the 12-pin connector so the word “TOP” on the cable connector is pointing upwards (towards the sky). Insert the cable connector into the Roof Module. Push the connector in until it “clicks” and locks in place. To remove, grasp the connector to compress the two side latches and pull away from the Roof Module.

Note: Do not force the connector. If the connector does not engage easily, check for the correct orientation of the connector.

Figure 7-9 Roof Module Main Cable Harness Connection



2. Attach the LAN connector to the Roof Module. See *Figure 7-10*.

Orient the Ethernet cable connector with the connector under the receiver so the contacts on the cable connector are pointing towards the back of the vehicle. (This will usually be towards your right side if you are standing on the left side of the vehicle and looking towards the Roof Module.) Slide the cable connector into the receiver and rotate the plastic bayonet sleeve clockwise to lock the connector. The bayonet sleeve will “click” when it fully engages and locks. To remove the cable, rotate the bayonet sleeve counterclockwise until it “clicks” and pull the connector down or away from the Roof Module.

Note: Do not force the connector. If the connector does not engage easily, check for the correct orientation of the connector.

Figure 7-10 Roof Module Ethernet Connection



3. Route the Main Cable Harness down the right side of the cab, across the back of the cab, and into a grommet which allows access into the cab. See *Figure 7-11*.

Note: This may require cutting a slot in the rubber grommet to allow the wires to pass through.

Figure 7-11 Routing the SA Module Cable into the Cab



Main Cable Harness Connections Inside Cab

Figure 7-12 shows the Main Cable Harness connections used inside the cab. Table 7-1 shows the functions of the Main Cable Harness cab connectors. Refer to your Display user manual for instructions on connecting the Main Cable Harness connections shown to the correct ports and harnesses on the Display and Display cables.

Figure 7-12 Main Cable Harness Cab Connections

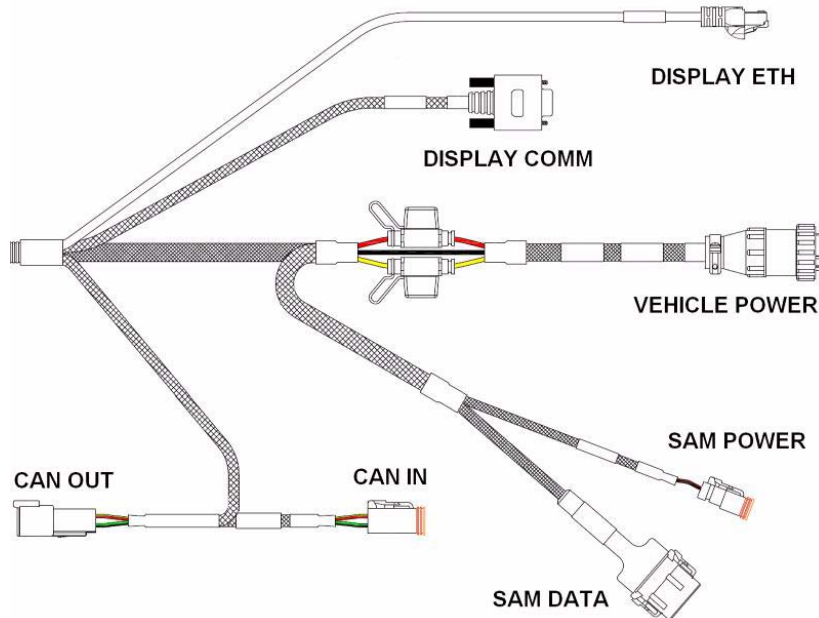


Table 7-1 Cab Main Cable Harness Connector Functions

Main Cable Harness Connector	Connector Function
DISPLAY ETH	Display Ethernet Port (RJ-45)
DISPLAY COMM	Display Communication Port (DB-9)
VEHICLE POWER	12 Volt Power Supplied by Display Harness
SAM POWER	Power for SA Module
SAM DATA	Data for SA Module
CAN IN	Not Used for This Installation
CAN OUT	Not Used for This Installation

SA Module Harness

1. Connect the 12-pin data and 2-pin power connectors between the Main Cable Harness and the SA Module Harness. See *Figure 7-13*.

Figure 7-13 Connect Main Cable and SA Module Harnesses



Power Supply Connection

The following sub-sections describe basic instructions for connecting the AutoSteer system to available vehicle power sources:

- *Cab Power Connection*
- *Battery Power Connection*

Note: Refer to your Display user manual before connecting the AutoSteer system to vehicle power.

The Main Cable Harness must be connected to a 3-pin 12V power source. Your Display user manual provides specific instructions for connecting power to the AutoSteer system and specifies the appropriate vehicle power source.

Cab Power Connection

1. Locate the cab console right-side 12V power outlet. See *Figure 7-14*.
2. Use this 12V accessory power connector if the Display user manual specifies connecting to power inside the cab and connect the power to the three-pin socket in the cab using the supplied adapter cable.

Figure 7-14 Power Outlet Inside Cab



Battery Power Connection

1. Locate the vehicle battery on the right-hand side of the cab behind the steps. See *Figure 7-15*.
2. Connect to the vehicle battery if the Display user manual specifies a direct battery connection.

Figure 7-15 Battery Location



Note: A battery cable is provided with the AutoSteer system when a direct battery connection is required.

Post-Installation Procedures and Information

The **Post-Installation Procedures and Information** chapter provides information in the following sections:

- *Create New Vehicle*
- *Calibration and Tuning Guidelines*

Once the entire AutoSteer system, including the Display and Display Harnesses, have been installed on the vehicle, the procedures and notes provided in this chapter must be followed to complete the installation and prepare the vehicle for full AutoSteer capabilities.

Create New Vehicle

Once the entire system has been installed, the operator must first create a new vehicle profile. This configures the system so the User display can properly communicate with the various sensors and components on the vehicle. Follow the procedure below to create a new vehicle.

1. Make sure the User display is not powered ON.
2. Start the vehicle and take it to a clear area (such as an open field) where it can be calibrated.
3. Power up the AutoSteer system.
4. Follow the instructions provided in the Display user manual to create a new vehicle.

Calibration and Tuning Guidelines

Note: For optimal steering performance, the AutoSteer system must be fully calibrated and then tuned.

Final Hardware Installation Checklist

This **Final Checklist** chapter contains the verifications steps necessary after the installation of the AutoSteer system.

Note: The Final Hardware Installation Checklist is on the back of this page. Tear this page out of your manual and fill in the checklist after the installation. You should keep a copy of this checklist for future reference when servicing the vehicle.

Machine Model: _____ Year: _____ Serial #: _____

Customer Name: _____

Location/Address: _____

AutoSteer Installation Kit Part Number: _____

NOTES

Name of Installer: _____ Date: _____

System Installation Checklist

1. Wheel Angle Sensor installed and all fasteners are tight. (optional) ☐
2. Display Bracket is installed and all fasteners are tight. ☐
3. Display is installed and all fasteners are tight. ☐
4. Roof Rail and Roof Module are installed and all fasteners are tight. ☐
5. SA Module is installed and all fasteners are tight. ☐
6. All cable ends are connected. ☐
7. All cables are secured with cable ties. ☐

Hydraulic Installation Checklist

1. Steering Valve Bracket is installed and all fasteners are tight. ☐
2. Steering Valve is installed and all fasteners are tight. ☐
3. All hose fittings are tight. ☐
4. Check for oil leaks on all hydraulic connections. ☐
5. All hoses are routed and secured with cable ties. ☐
6. Manual steering is normal after the AutoSteer installation. ☐
7. Relief Valve is adjusted. ☐

AutoSteer Performance Checklist

1. Complete AutoSteer system calibration. ☐
2. Complete AutoSteer system tuning. ☐
3. Check total Wheel Angle Sensor counts. ☐ Value _____
4. Line acquisition is satisfactory. ☐
5. On-line steering is satisfactory. ☐
6. Manual override (kick-out) is working. ☐ Kick-out _____
7. Steering speed from lock-to-lock is satisfactory. ☐ Value _____ Sec.

Note: See the *Post-Installation Procedures and Information* chapter for additional information.
